2X ThinClientServer

Version 6.1

Manual

2X Software Ltd.

URL: www.2x.com

E-mail: info@2x.com

Copyright 2005-2009 2X Software ltd.

2X SOFTWARE Ltd.

http://www.2x.com

E-mail: info@2x.com

Information in this document is subject to change without notice. Companies' names and data used in examples herein are fictitious unless otherwise noted. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of 2X SOFTWARE Ltd.

2X ThinClientServer is copyright of 2X SOFTWARE Ltd.

2X is a registered trademark, and 2X ThinClientServer and the 2X ThinClientServer logo are trademarks of 2X SOFTWARE Ltd. in Europe, the United States and other countries.

Version 6.1 – Last updated 18 June 2009

Table of Contents

Introduction to Server-based computing 1
What is server-based computing? 1
The benefits of server-based computing 1
What are thin clients? 2
How does it work? 3
Server-based computing advantages in a nutshell 3

Introduction to 2X ThinClientServer 5
What is 2X ThinClientServer? 5
Which Edition do I need? 5
Enterprise Edition 5
Standard Edition 6
How it works 6
Step 1: Booting the thin client: 6
Step 2: 2X ThinClientOS connects to 2X ThinClientServer 7
2X ThinClientServer components 9
2X ThinClientServer features 10

Installing 2X ThinClientServer on Windows 13
System Requirements 13
Step 1: Run set-up 13

Installing 2X ThinClientServer on Linux 21
System requirements 21
Step 1: Dependencies 21
Step 2: (RPM) Install the package 21
Step 2: (DEB) Install the package 21
Step 3: Configure server after installation 22
Distributions with SELinux 26
Distributions with AppArmor 26
Step 4: Open Management Console 26

2X ThinClientServer Startup Configuration 27
To complete installation of 2X ThinClientServer 27

Configuring 2X ThinClientServer 37
Log into 2X ThinClientServer 37
Configuring the Directory Server 38
Desktop Components 40
User Profiles 45
2X ThinClientOS 49

Preparing the Thin Clients 51
Introduction 51
Thin Client System Requirements 52
Configuring a thin client to boot from a hard disk, USB or flash disk

(CD install) 52
Step 1: Downloading the thin client OS 52
Step 2: Burning the ISO image to a CD-ROM 52
Step 3: Configure the thin client to boot from CD-ROM 53
Step 4a: Installing 2X ThinClientOS on the hard disk 53
Step 4b: Installing 2X ThinClientOS on a USB disk 54
Step 5: Configure the thin client to boot from the hard disk/USB 54
Configuring a thin client to boot from a hard disk, USB or flash disk (Network install) 55
Configuring a thin client to boot via PXE 57
Step 1: Download the 2X ThinClientOS image 57
Step 2: Copy the image to a 3rd party TFTP Server (optional) 57
Step 3: Configuring thin clients to boot via PXE 57
Configuring a thin client to boot via Etherboot using the 2X ThinClientOS LiveCD 58
Step 1: Download the 2X ThinClientOS image 58
Step 2: Copy the image to a 3rd party TFTP Server (optional) 58
Step 3: Download the 2X ThinClientOS LiveCD 58
Step 4: Burning the ISO image to a CD-ROM 58
Step 5: Configure the thin client to boot from CD-ROM 59
Installing a new version of 2X ThinClientOS 59

Managing Thin Clients & Sessions 62
Introduction 62
Managing the thin clients 62
Setting thin client defaults 63
Editing thin client settings 63
General settings 64
Operating System Options 64
Input Devices 65
Display Settings 66
Sound Settings 68
Login Screen 69
Login Banner 70
Desktop Shadowing 71
Groups 71
Deleting a thin client 73
Setting default settings for all thin clients 73
Power Options 74
Switch on a Thin Client 74
Shutdown a thin client 74
Rebooting a thin client 74
Managing Printers 75
Managing Banners 77
Managing the 2X DHCP Helper 77
Views 78
Setting default settings for all thin clients 79
Reporting 80
Sessions 80

Support ... 81
Licensing ... 81
Administrators ... 82
Backup Servers ... 83
System Backup ... 84
Introduction ... 86
Logging on to your desktop ... 86
Logging off the Terminal Server ... 87
Accessing local shares & storage devices ... 88
Printing to a local printer ... 89

Upgrading or Repairing a 2X ThinClientServer Installation ... 90
Upgrading 2X ThinClientServer ... 90

Uninstalling 2X ThinClientServer ... 96
Uninstalling 2X ThinClientServer ... 96

Firewall Settings ... 97

Troubleshooting ... 98
2X ThinClientServer External Database ... 98
2X ThinClientOS Boot Process Error Messages ... 98
2X ThinClientOS Autoconfiguration Error Messages ... 100
2X ThinClientOS Update Error Messages ... 101
2X ThinClientOS Video Error Messages ... 105
2X ThinClientOS Sessions Error Messages ... 107
2X ThinClientServer (Windows) Slave Redundancy Error Messages ... 112
2X ThinClientServer (Linux) Install Error Messages ... 115
2X ThinClientServer (Linux) Configuration Error Messages ... 120
2X ThinClientServer (Linux) Slave Redundancy Error Messages ... 126

Advanced Configuration ... 130
2X ThinClientServer Configuration Options ... 130
DOMAIN_MODE_2003=1 ... 130
FORCE_SINGLE_VGA=1 ... 130
FORCE_VGA_REVERSED=1 ... 130
RDP_VERSION=4 ... 131
NUMLOCK=ON ... 131
DESKLOCK=1 ... 131
ICA_HOTKEYS=ON ... 131
LOAD_NX=1 ... 131
LOAD_RDP=1 ... 131
LOAD_ICA=1 ... 131
LOAD_2XA=1 ... 131
CODEPAGE=437 ... 131
MASTER_VOLUME=99 ... 132
BLANK_TIME=5 ... 132
SKIP_VNC_PROMPT=1 ... 132
MOUSE_SERIAL=1 ... 132

Specifications for 2X ThinClientOS ... 133
PXE Booting ... 133

Minimum Supported Specifications 133
Recommended Supported Specifications 133
CD Booting 134
Minimum Supported Specifications 134
Recommended Supported Specifications 134
HDD / Flash Booting 135
Minimum Supported Specifications 135
Recommended Supported Specifications 135
Legacy DHCP configuration 136
Preparing the DHCP server (Windows) 136
Part A – Booting over the Network 136
Part B – Booting from media 138
Preparing the DHCP server (Linux) 143
Preparing the DNS server (optional) 144
Configuring Time Synchronization (optional) 144

Introduction to Server-based computing

What is server-based computing?

Server-based computing (SBC) is a technology whereby applications are deployed, managed, supported and executed on the server and not on the client. Instead only the screen information is transmitted between the server and client. This architecture solves the many fundamental problems that occur when executing the applications on the client itself.

In SBC environments hardware & software upgrades, application deployment, technical support, and data storage & backup are simplified because only the servers need to be managed. Data and applications reside on a few servers rather then on hundreds or thousands of clients. PCs become terminals and can be replaced by simpler, less expensive and most importantly easier to manage devices called "thin clients."

The benefits of server-based computing

1. Management - Administrators can deploy, manage and support applications much more easily because they are held on a central server (or central server farm) and are managed from a single point, simplifying application access and administration.
2. Device independence - Users can access their desktop and indeed any enterprise application from any type of client device.
3. Remote Access – Users can access their desktop and enterprise applications from anywhere on the network, or from home, or on the road.
4. Performance – Server-based computing performs better than a web application or using a client server model. These types of applications require a lot of data to be sent back and forth between the server and the client. Because of the advanced compression ratios achieved by protocols such as ICA, NX and RDP, sending just the screen updates between the server and client is much faster.

5. Security – Server-based computing keeps all the data on the secure servers without it being 'spread out' onto the less secure client computers. Furthermore the server is in the server room, which is far more secure than on the user's desk.
6. Less prone to viruses and security breaches – Servers are by definition better managed and because the server OS is more secure, it's far more difficult for a computer to get infected by a virus.
7. Eliminates patch management of clients – Clients are not running Windows, there is no need to patch the desktop computers on a regular basis.
8. Server-based computing reduces Total Cost of Ownership [TCO] by as much as 50%.
9. Scalability – New servers and clients can easily be added to the network.
10. Increased availability – It's easy to make the terminal servers fault tolerant and to perform load balancing. In addition, servers are inherently designed to be more reliable than your average desktop.

What are thin clients?

A thin client is a general term for a device that relies on a server to operate. It provides a display device, keyboard and mouse and basic processing power in order to interact with the server. It does not store any of the data locally – it's very thin in features and functionality – hence the term 'thin client'.

A thin client often does not have local storage and requires little processing resources. Thin client hardware can be a converted old PC, a dedicated thin client device, or simply a new low cost PC with a thin client OS installed. The fact that little processing power is needed and that the hardware can be used for longer periods of time (on average 6 years instead of 3 years) means that the capital expenses for desktops is significantly reduced.

Most importantly, the overhead costs associated with administration, maintenance, support, security and installation are significantly lower than with a traditional PC.

How does it work?

Figure 1: Server-Based Computing

The server-based computing technology revolves around 3 main components:

1. A multi-user operating system that allows multiple users to log on and work concurrently, using applications in separate, protected sessions on a single server. Examples of terminal servers are Microsoft Terminal Services 2000/2003, Citrix Metaframe and 2X TerminalServer for Linux.
2. A thin client, which runs a minimal amount of software, but at least one program that connects to the terminal server. The thin client and the terminal server can be running completely different types of operating systems: For example Linux based thin clients are currently the most popular way to connect to a Windows terminal server! On the thin client there will be a program such as rdesktop (Linux) or Remote Desktop Connection (Windows) to connect to the terminal server.
3. A protocol to allow the terminal server and thin client to communicate and send only the keystrokes, mouse clicks and screen updates across the network. Of course this will be suitably compressed. Popular protocols are RDP (Remote Desktop protocol), ICA and NX.

Server-based computing advantages in a nutshell

Server-based computing is currently considered as the most efficient, flexible and cost-effective solution for application delivery and administration. It boasts the following advantages:

- Reduces desktop hardware investment
- Significantly reduces administration staffing costs
- Significantly reduces desktop maintenance costs
- Virtually removes the need for desktop upgrades

- Removes desktop software application upgrades
- Removes desktop operating system upgrades
- Removes viruses from the desktop
- Reduces training costs
- Reduces bandwidth costs
- Reduces or eliminates the need for remote office servers
- Reduces user downtime while waiting for help desk response
- Reduces system downtime through better redundancy and disaster recovery capabilities
- Applications available to all users anytime and anywhere
- Quick expansion through ease of deployment
- Enables standardization of corporate applications
- Reduces risk of data loss since data is centralized and can be more easily backed up
- End users will experience improved support
- Helps prevent theft of company data
- Reduces/Eliminates installation of non productive software such as games.

Introduction to 2X ThinClientServer

What is 2X ThinClientServer?

2X ThinClientServer provides a complete solution for the central deployment, configuration and management of thin clients, and provides load balancing and redundancy of terminal servers.

A small footprint Linux distribution is deployed to thin clients (all popular thin clients are supported) OR to normal PCs, allowing you to convert existing PCs to thin clients. Thin client settings (screen size, which terminal servers to log into, etc.) can be controlled centrally.

2X ThinClientServer is thin client vendor independent: You can use old computers, new low cost computers and dedicated thin client devices from different vendors - and manage all these thin clients through one consistent and open interface.

Rather then have to commit to one particular thin client vendor and be forced to buy all your hardware from that vendor, you can get flexibility to choose what's best for you and the possibility to re-use your old computer hardware.

Which Edition do I need?

2X ThinClientServer is available in 2 editions. In both editions 10 licenses are available for an unlimited period of time with full functionality.

Enterprise Edition

2X ThinClientServer Enterprise Edition provides a complete feature set for the administrator to provide Thin Clients with connections to the broadest range of Server-based Terminal Services, including:

- Windows Terminal Services
- 2X Application Server
- NX Linux Terminal Server
- Citrix Published Applications
- Citrix Desktop

This edition also includes features such as a fully fledged reporting

tool based on both users and clients. The administrator has the ability to do remote shadowing of the Thin Client as well as switching them on and off remotely. To help scale your centralized ThinClientServer deployment, a set of fully redundant ThinClientServers can be installed on the same network. These will be capable of distributing the load of both the ThinClientServer as well as the network bandwidth in your organisation. Should the ThinClientServer/s be unavailable, the Thin Client will be capable of working in offline mode if a cache is available. This feature is only available for licensed customers.

Enterprise Edition License holders also have access to commercial grade support via online support services.

Standard Edition

2X ThinClientServer Standard Edition provides a free alternative to Enterprise Edition, with a reduced feature set.

- Only 10 licences will be available to use for free.
- Support only via user-to-user forums on http://www.2x.com/forums.

How it works

In a nutshell, 2X ThinClientServer serves out the 2X ThinClientOS to the thin clients. After the 2X ThinClientOS has booted, it obtains its connection settings from the 2X ThinClientServer. These settings are then used to connect to the terminal server.

The 2X ThinClientOS itself can be retrieved from the TFTP (Trivial File Transfer Protocol) server (included with 2X ThinClientServer) via PXE or Etherboot (also supplied on the CD-ROM which does not rely on the network card's ROM to load the PXE stack), or it can be booted from a storage device (Hard disk, CD-ROM, USB). The exact process by which the thin client boots and presents the desktop to the user is explained in the following steps:

Step 1: Booting the thin client:

1. The thin client/computer is switched on. Based on the BIOS setting, the thin client/computer now boots either via the hard disk, PXE, Etherboot, USB or CD-ROM.

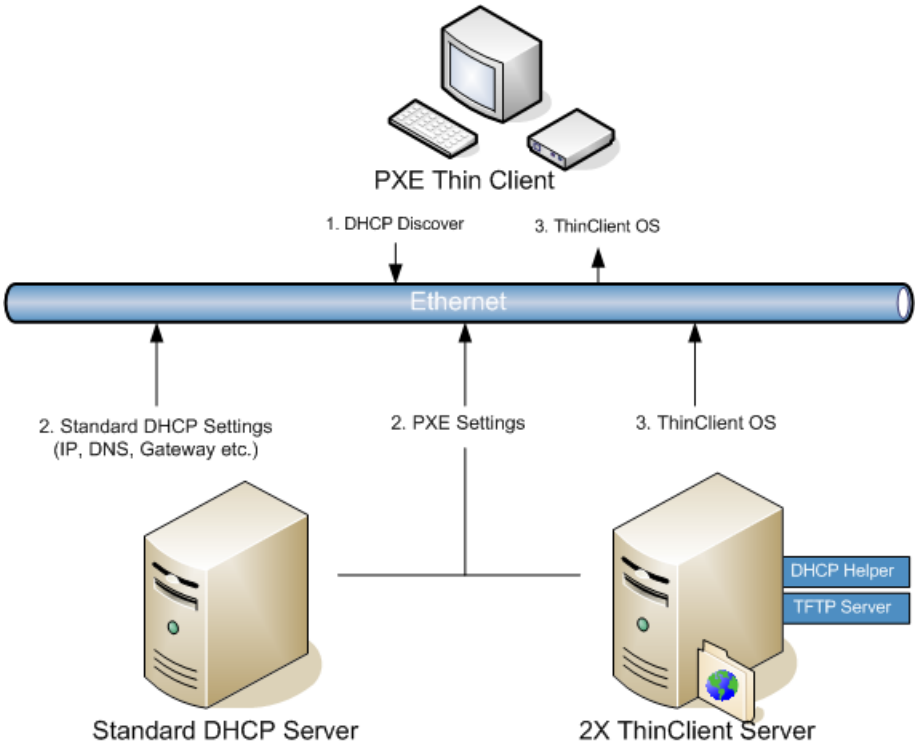


Figure 2: PXE booting

2. If you have selected PXE booting OR Etherboot, the thin client/computer will obtain the IP address of the TFTP server via DHCP broadcasts. (In most installations the TFTP server will be installed on the same server as 2X ThinClientServer). The thin client will then download the 2X ThinClientOS image from the TFTP server and proceed to boot up the thin client using that Operating System image.
3. If you chose to boot 2X ThinClientOS from USB, CD-ROM, or hard disk, the operating system will boot up directly from that image without retrieving the image from the TFTP server.

Step 2: 2X ThinClientOS connects to 2X ThinClientServer

1. After 2X ThinClientOS has booted, it obtains the IP address of 2X ThinClientServer from the network settings returned by the 2X DHCP Helper Service.

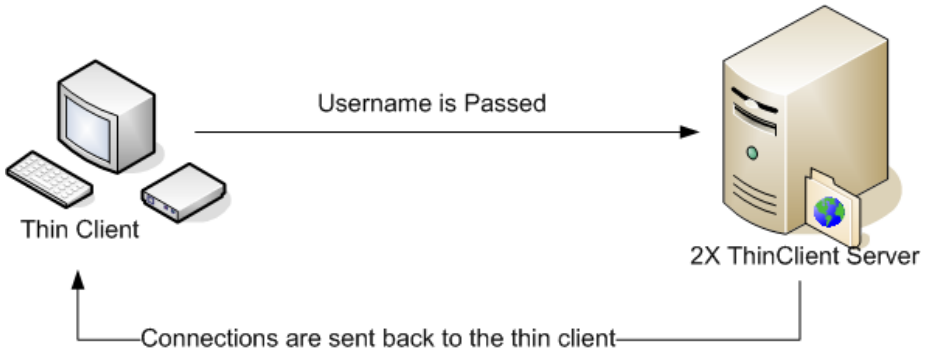


Figure 3: PXE booting

2. 2X ThinClientOS now prompts for the *username* and *password*. The *username* is passed to 2X ThinClientServer, which then looks for the user in the 2X ThinClientServer's built-in database or Active Directory server. It finds the associated user profile and matches this user profile with connection settings for that user in the 2X ThinClientServer database. These connection settings are passed back to 2X ThinClientOS. The applications that are required for that particular user are downloaded on demand and cached locally after the user has logged off successfully. If the ThinClientServer ever goes offline, the cached copy of the ThinClientOS files is used instead.
3. 2X ThinClientOS now runs the appropriate remote desktop client (RDP, ICA, and NX) with the required settings, including username and password, and connects the user to the correct terminal server.

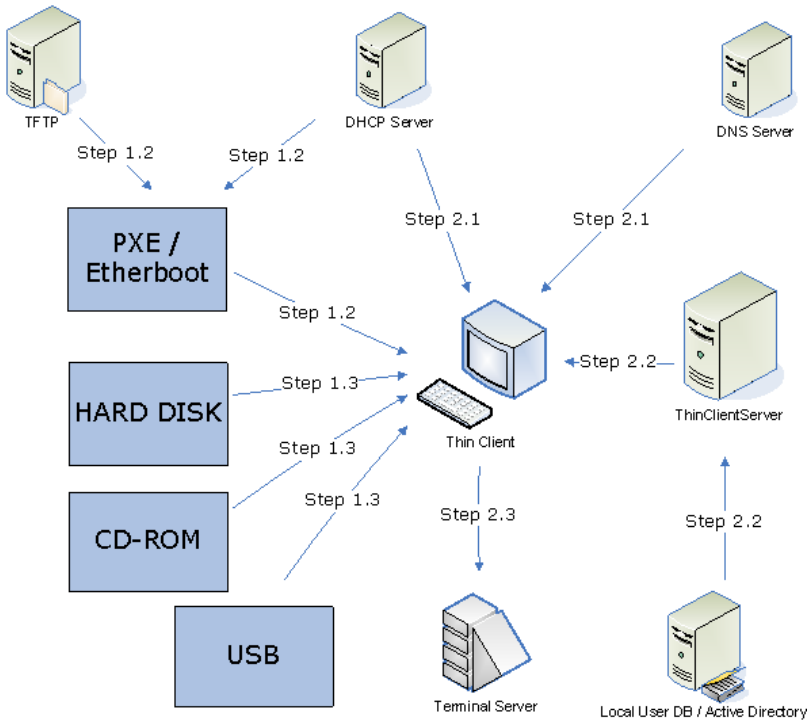


Figure 4: The complete thin-client boot and connection process

2X ThinClientServer components

2X ThinClientServer consists of a number of components:

1. The 2X ThinClientOS image – the actual Operating System that the thin client will boot. This image is either written to the hard disk or CD-ROM, and booted from there, or it is downloaded via TFTP and booted after download.
2. The 2X ThinClientServer program, which interacts with the actual thin client.
3. The 2X DHCP Helper service, which provides additional parameters to thin clients to enable centrally managed thin clients to communicate with 2X ThinClientServer.
4. A TFTP server – to serve out the 2X ThinClientOS image to the computers booting via Etherboot or PXE
5. A Management Console – to allow for web based configuration of all the connection settings. This is provided via a web server, namely Apache. Apache is one of the World's most widely used web servers. Originally developed in 1995 by a group that went on to become the Apache Group, the Apache HTTP Server is Open Source Software, and considered by proponents to be fast, scalable and secure.

6. A MySQL server – this is a light-weight SQL database server that stores all the connection settings for the users.
7. The PHP environment – PHP hypertext pre-processor is a widely-used general-purpose scripting language that is especially suited for web development.

2X ThinClientServer features

Thin client vendor independent

Use thin clients from different vendors, old/existing computers, or new low cost computers - and manage all these thin clients through one consistent and open interface. Rather than having to commit to one particular thin client vendor from whom to buy all your hardware, you get the freedom to choose and the possibility to re-use your existing computer hardware.

Web-based management interface

Thin client devices and users' connection settings can be managed centrally via the web management interface. It shows currently active thin clients and user sessions, generates reports, and includes a centralized database of thin client events, for easy troubleshooting.

Easy updates of thin client operating system & software

Updates to 2X ThinClientOS are easily deployed: Just download the latest version from the 2X website and copy it to the Thin Client Server: Thin clients booting from PXE will use the new OS at next boot-up. Thin clients booting from the hard disk or USB disk can be remotely updated via the web-based interface.

Manage user's connection settings centrally

Centrally configure user's connection settings such as terminal server name, type (RDP, Citrix ICA or NX), screen resolution and more. There is no need to push out these connection settings to the thin client devices, since they are retrieved when the user logs on.

Supports local media, sound, and printers

Locally connected printers or storage devices are supported seamlessly. Printers will show up in the list of printers on the users' desktop, and local media will appear in Windows Explorer just like other media. Thin clients will forward sound from the Terminal Server.

How it works

2X ThinClientServer deploys a small footprint Linux-based OS to old PCs, new low cost PCs and to popular thin client devices (HP, Neoware, Wyse, Maxspeed and more). Thin clients always boot the latest version of the OS from the ThinClientServer. Hardware & connection settings (including resolution, logging and more) are retrieved from the server when the client logs on, making thin clients easy to manage.

Connection settings are managed based on username, group or department

Most thin client management software can only configure connection settings based on device. 2X ThinClientServer links connection settings to Active Directory/LDAP usernames, groups or OU's (organizational units). This reduces the administration involved with adding users and managing roaming users.

Convert old PCs to powerful thin clients

2X ThinClientServer allows you to extend the life span of your current computers by converting them to thin clients. Re-using your old PCs or extending the life span of your current ones adds up to considerable savings over time.

Server runs on Windows or Linux

2X ThinClientServer is available for both Windows or Linux servers, and includes a TFTP server for deployment of the ThinClientOS.

Use low cost thin clients

Because 2X ThinClientServer includes a thin client OS and a centralized management interface for all thin client devices, you can opt for low-cost thin clients without OS & management software. This is the most expensive part of a thin client and can increase the per thin client cost from $200 to $500.

Thin client computing: reduced administration and end user support

Administrators can enjoy greatly reduced support and administration: Thin clients are far easier to manage since the thin client OS is deployed centrally and only includes a remote terminal client. Only the servers need to be managed, meaning that deploying patches, applications and virus updates is far easier. Enforcing desktop settings and backing up user files is easier too. Better security and fault tolerance is achieved by using RAID, load balancing and housing the Terminal Servers in a secure, air-conditioned server room. Helping users is simple too: Just shadow their session in real time and find out exactly what is happening without getting off your chair

Other Features

- Thin clients can boot via PXE, CD ROM, USB, floppy or hard disk
- Thin clients can be discovered via SNMP, allowing you to use other network management software if desired
- Thin clients allow trouble-shooter information to be retrieved for debugging and customer support
- Reports on thin clients and user sessions
- Customizable Automatic User Login
- Session Shadowing
- Customize logon screen with your own logo
- Supports RDP (including 2X published applications), ICA (including Citrix published applications), and NX protocols.
- Supports a local web browser with optional Java and Flash

Installing 2X ThinClientServer on Windows

System Requirements

Before you install 2X ThinClientServer, please ensure that you meet all the following requirements

- Windows 2000/2003/2008 server or Windows 2000/XP.
- 256 MB of RAM or more
- 800 MHz processor or higher
- Approximately 128MB of free space for each 2X ThinClientOS you plan to upload.

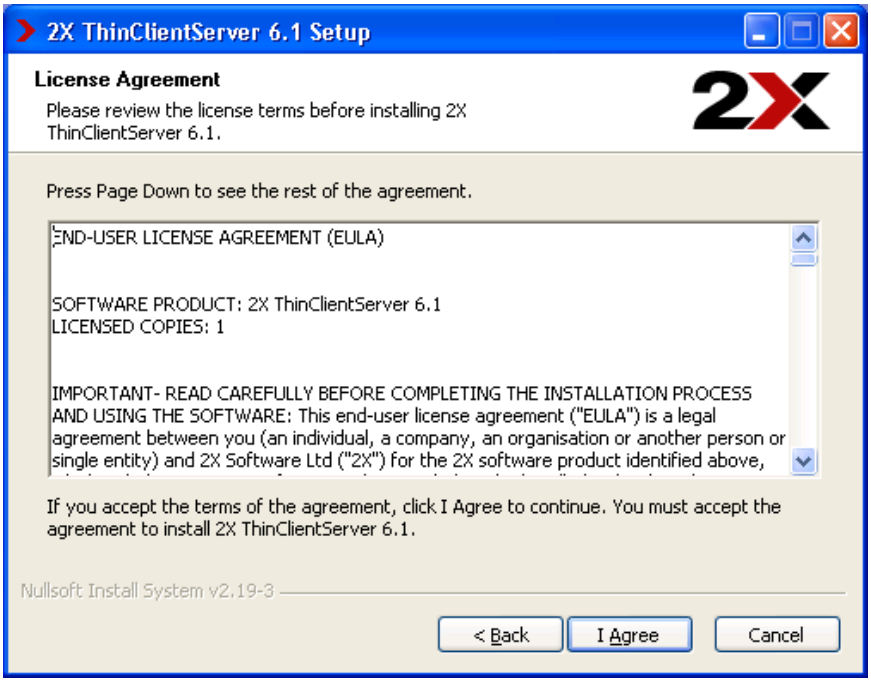
Step 1: Run set-up

1. Run set-up by double-clicking on the file 2XThinClientServer-setup.exe.

2X ThinClientServer 6.1 Setup
Welcome to the 2X ThinClientServer 6.1 Setup Wizard
This wizard will guide you through the installation of 2X ThinClientServer 6.1.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
2X
go thin, go linux!
Next >
Cancel

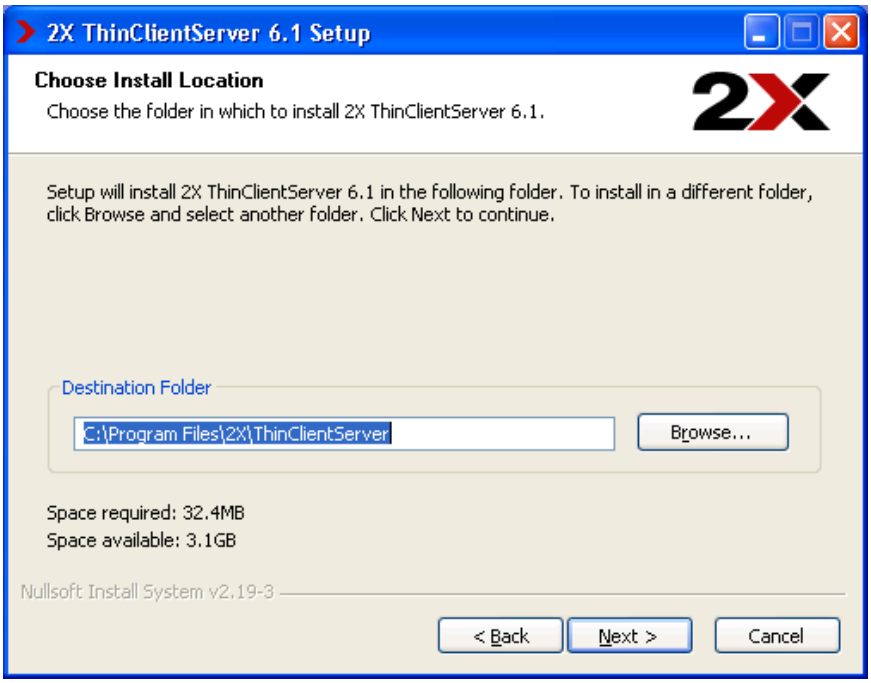
Screenshot 1: 2X ThinClientServer setup wizard

2. After the welcome screen loads, click Next to start installation.


2X ThinClientServer 6.1 Setup
License Agreement
Please review the license terms before installing 2X ThinClientServer 6.1.
Press Page Down to see the rest of the agreement.
END-USER LICENSE AGREEMENT (EULA)
SOFTWARE PRODUCT: 2X ThinClientServer 6.1
LICENSED COPIES: 1
IMPORTANT- READ CAREFULLY BEFORE COMPLETING THE INSTALLATION PROCESS AND USING THE SOFTWARE: This end-user license agreement ("EULA") is a legal agreement between you (an individual, a company, an organisation or another person or single entity) and 2X Software Ltd ("2X") for the 2X software product identified above,
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install 2X ThinClientServer 6.1.
Nullsoft Install System v2.19-3
< Back
I Agree
Cancel

Screenshot 2: License Agreement

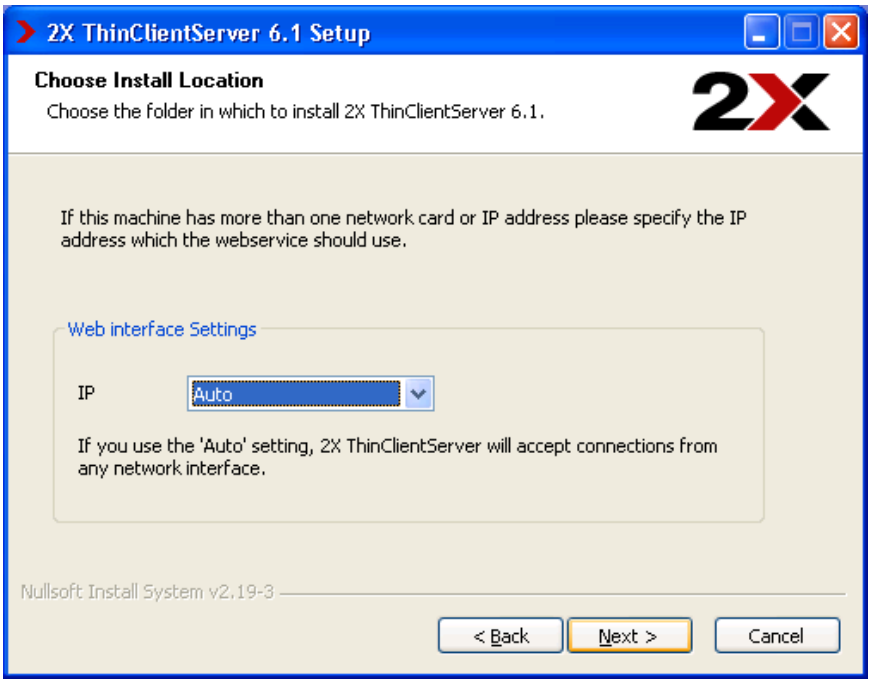
3. In the License Agreement dialog box, review the License Agreement and click 'I Agree' to continue with the installation.


2X ThinClientServer 6.1 Setup
Choose Install Location
Choose the folder in which to install 2X ThinClientServer 6.1.
Setup will install 2X ThinClientServer 6.1 in the following folder. To install in a different folder, click Browse and select another folder. Click Next to continue.
Destination Folder
C:\Program Files\2X\ThinClientServer
Browse...
Space required: 32.4MB
Space available: 3.1GB
Nullsoft Install System v2.19-3
< Back
Next >
Cancel

Screenshot 3: Choosing the installation folder

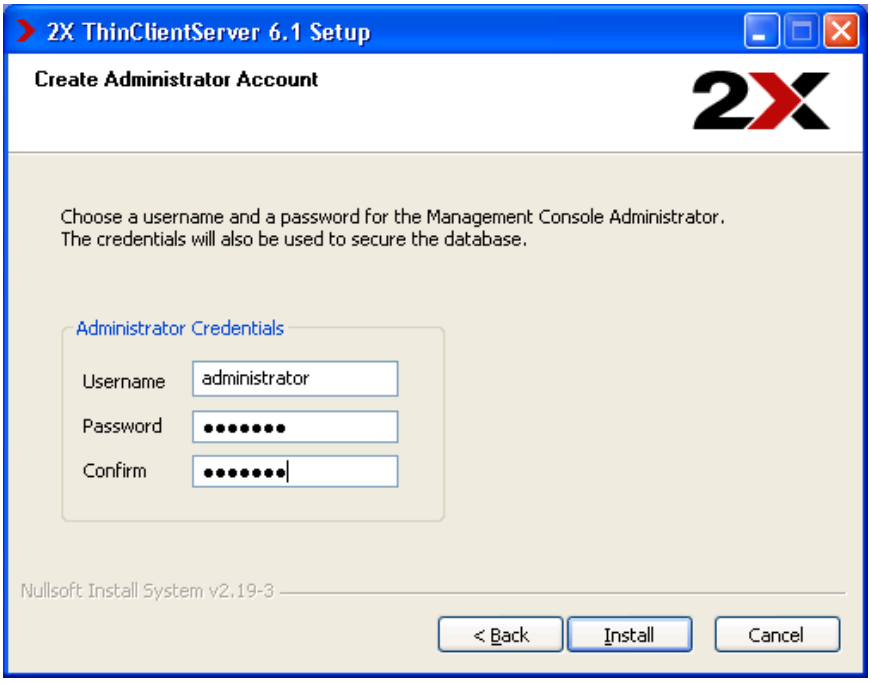
4. Choose the destination for 2X ThinClientServer and click 'Next'. 2X ThinClientServer will need a minimum of approximately 50

MB of free hard disk space.


2X ThinClientServer 6.1 Setup
Choose Install Location
Choose the folder in which to install 2X ThinClientServer 6.1.
2X
If this machine has more than one network card or IP address please specify the IP address which the webservice should use.
Web interface Settings
IP
Auto
If you use the 'Auto' setting, 2X ThinClientServer will accept connections from any network interface.
Nullsoft Install System v2.19-3
< Back
Next >
Cancel

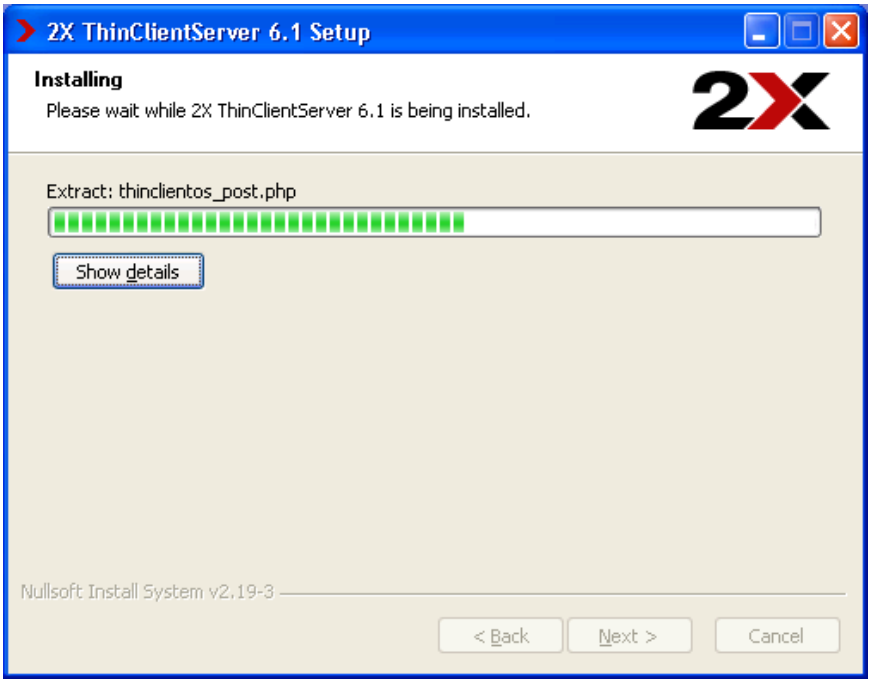
Screenshot 4: Choosing the IP addresses for the service to listen on

5. If you have multiple network cards, or multiple IP addresses on one network card, setup will ask you for the IP address to which the 2X ThinClientServer must bind. Selecting *Auto* will let the system decide which is the default IP address to use by the ThinClientServer.



Screenshot 5: Setting the database credentials

6. Setup will ask you for the username and password that will be used to connect to the 2X ThinClientServer database and login to the Management Console. Click 'Install' to start the installation.

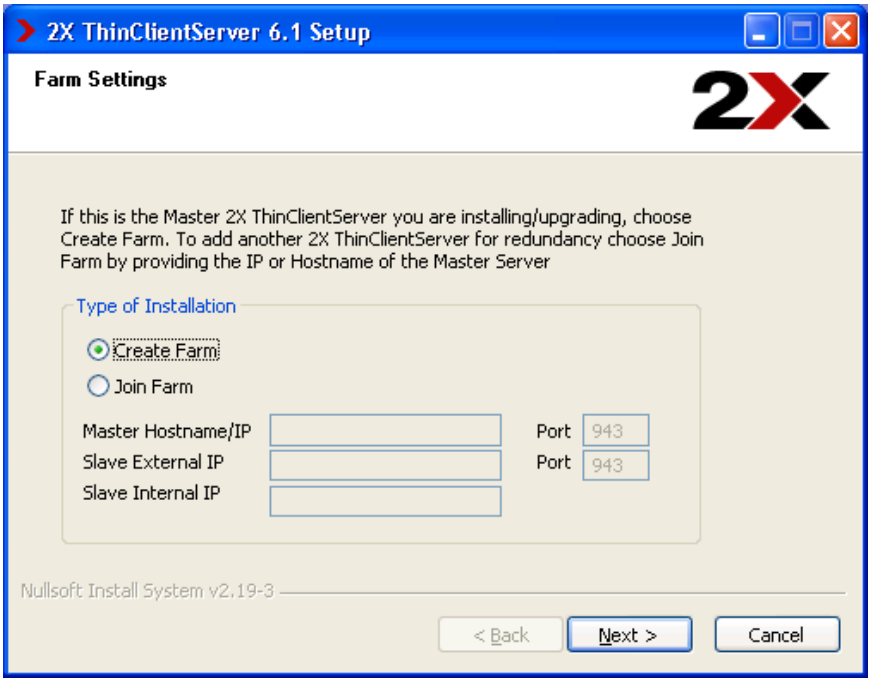


7. Setup will now copy all files and install the necessary services.

   Setup will have installed the following new services:

- 2X ThinClientServer Management Console (web-based)
- 2X TFTP
- 2X DHCP Helper
- MySQL

Windows XP Service Pack 2:
Please note that Windows XP Service Pack 2 has the Windows Firewall enabled by default, and the first time a Web Server is installed (such as 2X ThinClientServer Management Console), will request the user to confirm whether to continue blocking "Apache HTTP Server". It will be necessary to click the "Unblock" button on this dialog for the Management Console to function correctly.

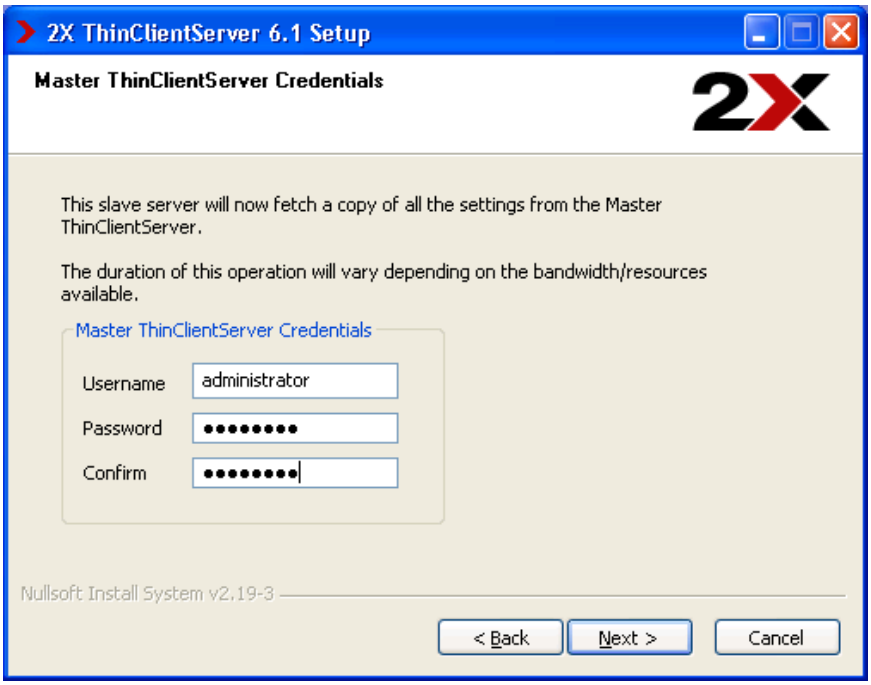

2X ThinClientServer 6.1 Setup
Farm Settings
2X
If this is the Master 2X ThinClientServer you are installing/upgrading, choose Create Farm. To add another 2X ThinClientServer for redundancy choose Join Farm by providing the IP or Hostname of the Master Server
Type of Installation
Create Farm
Join Farm
Master Hostname/IP
Port
943
Slave External IP
Port
943
Slave Internal IP
Nullsoft Install System v2.19-3
< Back
Next >
Cancel

Screenshot 6: Choose Server configuration in a Farm scenario

8. Set-up will ask you whether you want to create a 2X ThinClientServer farm or join an existing farm. If this is the first time you are installing 2X ThinClientServer, choose "Create Farm". If you want to add a 2X ThinClientServer to an existing installation to improve the deployment of thin clients in large installations, then choose "Join Farm" and enter the IP address of the 2X ThinClientServer hosting the farm as the Master Hostname (typically the first 2X ThinClientServer). The Slave External IP is the address which will be used by the Master to communicate to the slave machine that you are currently installing. If there is port forwarding configured to redirect traffic to the slave TCS, enter the address of the external IP of the gateway at the remote site. The Slave Internal IP should be the

IP address which will be used by your thin clients to boot against the 2X ThinClientServer.

Firewall Issues:
Please note that for a member server to join a farm successfully, it will be necessary to ensure that TCP connections on port 943 to the 2X ThinClientServer hosting the farm can be established.


2X ThinClientServer 6.1 Setup
Master ThinClientServer Credentials
2X
This slave server will now fetch a copy of all the settings from the Master ThinClientServer.
The duration of this operation will vary depending on the bandwidth/resources available.
Master ThinClientServer Credentials
Username
administrator
Password
Confirm
Nullsoft Install System v2.19-3
< Back
Next >
Cancel

Screenshot 7: Initiating the replication process from the Master Server…

This step is optional depending on if you chose to join an existing farm. You must now enter the credentials to connect to the Web Based Management Console which have been previously configured on the Master Server. This will then initiate the replication process and pull all the settings and files from the Master Server. This can take a bit of time depending on the amount of bandwidth available between sites.

2X ThinClientServer 6.1 Setup
Configure your 2X ThinClientServer
2X
To successfully configure your 2X ThinClientServer you will need to:
1) Login using the Management Console Administrator Credentials.
2) Follow the wizard to quickly setup your 2X ThinClientServer for first use.
3) Customise your 2X ThinClientServer configuration from the Management Console.
Nullsoft Install System v2.19-3
< Back
Next
Cancel

Screenshot 8: Waiting for the user to complete configuration …

9. You must now connect to the 2X ThinClientServer Management Console. Follow the steps shown during installatin to start configuring your Management Console. Please refer to Chapter 5 - Initial Configuration of 2X ThinClientServer for detailed initial configuration information.

   You may launch the Management Console at any time for further configuration by starting a web browser and enter the name of the machine on which 2X ThinClientServer is installed on port 980. (For example: http://thinserver.2x.com:980)

10. Now that setup is complete you can start using your new 2X ThinClientServer. Click the “Finish” button to close the installation wizard. You can choose to automatically open 2X ThinClientServer after finishing the installation to start configuring it.

2X ThinClientServer 6.1 Setup
Completing the 2X ThinClientServer 6.1 Setup Wizard
2X ThinClientServer 6.1 has been installed on your computer.
Click Finish to close this wizard.
Start configuring your 2X ThinClientServer
2X
go thin, go linux!
< Back
Finish
Cancel

Screenshot 9: Completing the 2X ThinClientServer Installation procedure.

Installing 2X ThinClientServer on Linux

System requirements

Before you install 2X ThinClientServer, please ensure that you meet all the following requirements

- RPM-based or Debian-based Linux distribution
- 256 MB of RAM or more
- 800 MHz processor or higher
- Approximately 128MB of free space for each 2X ThinClientOS you plan to upload.

Step 1: Dependencies

Distributions	Dependency Packages
OpenSuSE 11.0	compat-openssl097g
	compat-expat1
CentOS 5.2	compat-libstdc++
Fedora Core 9	compat-libstdc6++-33.i386
	compat-libstdc++
All Debian based	libstdc++5 (>= 1:3.3.4-1)

Table 1: Dependencies

Please ensure that the dependencies, as outlined in the above table, are met before trying to install 2X ThinClientServer.

Step 2: (RPM) Install the package

Download the RPM from the 2X download site and open a terminal as root (super user). Change directory to the location where you downloaded the RPM and run the following command:

```
rpm -Uvh thinclientserver-x-y.i386.rpm
```

Step 2: (DEB) Install the package

Open a terminal as root (super user). Change directory to the location where you downloaded the DEB from the 2X download site. Run the following command:

dpkg -i thinclientserver-x-y.i386.deb

Step 3: Configure server after installation

It is required to configure the 2X ThinClientServer before the service is started up. Open a terminal as root (super user). Run the following command:

2Xthinclientserver_conf.sh

```
Welcome to the 2X ThinClientServer configuration script.
Please follow the instructions carefully!

Preparing report XML file and detecting critical tools ...
Backing up current configuration files ...
Determining an appropriate pager ...
Using pager:less

Do you want to review the End User License Agreement? [Y/N] n
Do you accept the End User License Agreement? [Y/N] y

Checking that no 2X ThinClientServer services are running ...

Determining your network setup ...

Testing whether SELinux is enabled ...
SELinux is currently disabled. Skipping SELinux configuration.
Testing whether Apparmor is enabled ...
Apparmor is currently disabled. Skipping Apparmor configuration.
Testing for the existance of a firewall ...
No firewall was detected.

The number of interfaces installed is:3
Do you want the script to auto detect the best configuration? [Y/N]
```

Screenshot 10: Auto detection and licence review

In the first part, the configuration script detects whether all necessary tools are present on the system. Then it backs the current configuration files for safe keeping. You can then review the license agreement and accept to continue.

Next, the network and security setup is probed. You are then shown the total number of network interfaces installed on the machine. If you have only one interface (localhost is ommitted here) installed then the script will automatically detect the best configuration. On the other hand if, as in the figure above, you have multiple interfaces, you have the choice of manually choosing which interface you wish your services to bind to. We recommend that you allow the configuration utility to auto detect the network configuration.

```
Do you want the script to auto detect the best configuration? [Y/N] y
Checking for port conflicts and building IP lists ...

Please choose from the following menu entries:
***********************************************

1) Configure as a master server.
2) Join server as a slave in a farm.


Please enter a number []:
```

Screenshot 11: Master or Slave Menu

The setup then will then ask you to either configure this installation as a master server, i.e. to create a farm, or join this installation, as a slave, in a farm. Please choose accordingly.

```
Please choose from the following menu entries:
***********************************************

1) Configure as a master server.
2) Join server as a slave in a farm.


Please enter a number []: 1

Building network configuration per service ...

The following credentials shall be used to secure the local MySQL database ...
Please enter a user name []: admin
Please enter a password:
Please confirm the password:

Please enter the master host name/IP [geoffrey]:
Please enter the master internal IP, as seen by the thin clients [172.19.0.40]:
```

Screenshot 12: Master details

If you are configuring a master server, you are prompted for a username and password to connect to the local MySQL database. You are also asked for the following information:

Master server host name or IP: This is used by the slave servers, if any, to communicate with the master server. Please note that hostnames should be resolvable by all slaves.

Internal IP address, as seen by the thin clients: This IP is used by the thin clients to communicate with the server.

```
Please choose from the following menu entries:
**********************************************

1) Configure as a master server.
2) Join server as a slave in a farm.


Please enter a number []: 2

Building network configuration per service ...

The following credentials shall be used to secure the local MySQL database ...
Please enter a user name []: admin
Please enter a password:
Please confirm the password:

The following credentials shall be used to connect to the master server's management console ...
Please enter a user name []: administrator
Please enter a password:
Please confirm the password:

Please enter the master host name/IP, as seen by the slave server []: 192.168.0.130
Please enter the master console port [943]:
Please enter the slave host name/IP, as seen by the master server [geoffrey]: 192.168.0.131
Please enter the slave console port [943]:
Please enter the slave internal IP, as seen by the thin clients [172.19.0.40]:
```

Screenshot 13: Slave details

If, on the other hand, you are configuring a slave, you are prompted for the following information:

- Local MySQL database credentials. These, as in the master configuration, are using to connect to the local database.
- Master server management console credentials. These credentials are used during the synchronization of the slave with the master server.
- IP of master server.
- The master console secure port. This, by default, is port 943.
- The IP address or host name of the slave server. This information will enable the master server to communicate with the slave server during the synchronization as well as when pushing updates.
- The slave console secure port.
- Internal IP address, as seen by the thin clients: This IP is used by the thin clients to communicate with the server.

```
************************************************
Service: mysql
IP: 127.0.0.1
Port: 3306
************************************************
Service: apache
IP: 0.0.0.0
Port: 980 943
************************************************
Service: dhcphelper
IP: 0.0.0.0
Port: 67 4011
************************************************
Service: tftp
IP: 0.0.0.0
Port: 69
************************************************
MySQL database account: admin
************************************************
Master host, external: geoffrey
Master host, internal: 172.19.0.40
************************************************

Do you agree with the above settings? [Y/N] 
```

Screenshot 14: Review information

After entering all the information, you can review all details before porceeding with the configuration. If you are not satisfied, select *No* to go back and input the information again. Enter *Yes* if you agree.

```
Please wait while configuring service mysql   /
Please wait while configuring service apache   |
Please wait while configuring service dhcphelper   |
Please wait while configuring service tftp   |

Configuring this installation as a Master server ...

Starting 2X ThinClientServer httpd service                          done
Starting 2X ThinClientServer mysql service                          done

Please wait while installation is being configured   |

Stopping 2X ThinClientServer httpd service                          done
Stopping 2X ThinClientServer mysql service                          done

Thank you for configuring the 2X ThinClientServer product.
Starting the 2X ThinClientServer services ...
Starting 2X ThinClientServer httpd service                          done
Starting 2X ThinClientServer mysql service                          done
Starting 2X ThinClientServer tftpd service                          done
Starting 2X ThinClientServer dhcphelp service                       done
Backing up the XML report and log files for future reference ...
```

Screenshot 15: Services configuration and startup

After you agree with all the settings, each individual service is configured. When this has finished, the Apache and MySQL services are started and the installation configured as either master or slave. Please note that this task can take a while to complete, especially during a slave server configuration. Finally all services are started and the script exits.

Distributions with SELinux

If SELinux has been configured in enforcing mode, the script will test whether the 2X ThinClientServer services will start correctly. If not, the script will also suggest SELinux policy modifications. You need to accept these modifications before these are configured inside the policy.

Distributions with AppArmor

2X ThinClientServer comes with a set of AppArmor profiles to add another security layer. These profiles are installed, when AppArmor is enabled, and encapsulate all 2X ThinClientServer services. Thus confined, the services have limited file system access and cannot execute arbitrary utilities and programs.

Step 4: Open Management Console

You must now connect to the 2X ThinClientServer Management Console to configure the initial parameters for 2X ThinClientServer by starting a web browser and entering the name of the machine on which 2X ThinClientServer is installed on port 980 (for example: http://thinserver.2x.com:980)

Please refer to Chapter 5 for detailed initial configuration information.

You may launch the Management Console at any time for further configuration by starting a web browser and entering the name of the machine on which 2X ThinClientServer is installed on port 980.

Firewall Issues:
Please note that for a 2X ThinClientServer Management Console to function, it will be necessary to ensure that TCP connections on port 980 to the 2X ThinClientServer can be established. *Please note that for a DHCP Server to provide TCP/IP settings to the Thin Client successfully, it will be necessary to ensure that:* *1) UDP connections on port 67 to the DHCP Server can be established.* *2) UDP connections on port 68 to the Thin Client can be established.* *3) UDP connections on port 67 to the 2X ThinClientServer can be established for the 2X DHCP Helper Service.* *4) UDP connections on port 69 to the 2X ThinClientServer can be established for the 2X TFTP Service.*

2X ThinClientServer Startup Configuration

To complete installation of 2X ThinClientServer

Ensure that JavaScript is enabled on the Web Browser you are using to access the Management Console. If JavaScript is not enabled, functionality of the Management Console will be severely impaired, and it will not be possible to complete the installation.

To enable JavaScript in Internet Explorer, go to Tools -> Internet Options -> Security tab. Select the Local Intranet icon and click on the "Custom Level…" button. Scroll down to Scripting -> Active Scripting and select the "Enable" option.

To enable JavaScript in Mozilla Firefox, go to Tools -> Options -> Content tab and select the "Enable JavaScript" option.

The 2X ThinClientServer is the place where all connection settings are stored. Upon boot-up, thin clients connect to the server and retrieve the settings that will determine how and to which terminal server they will connect.

Settings can be applied to an individual thin client (by MAC address), by username, by group (effectively capturing all the members of the group), or by organizational unit (OU). This gives the administrator maximum flexibility.

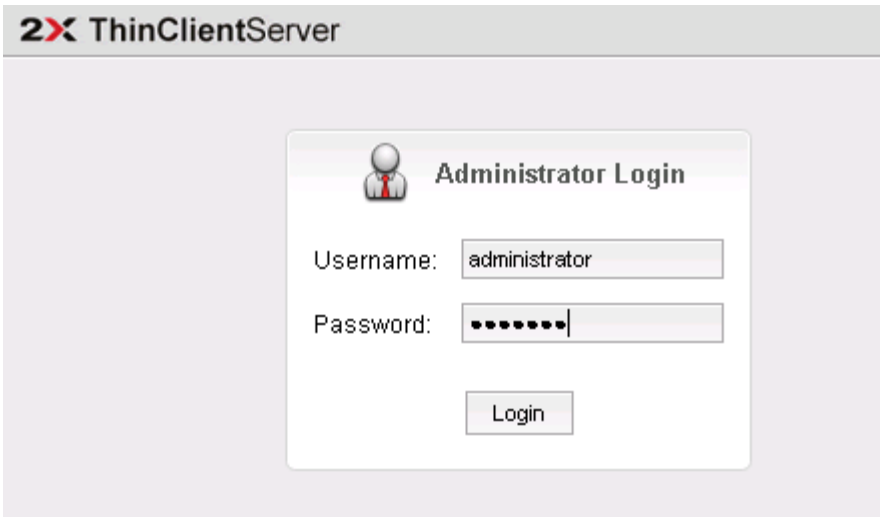
The 2X ThinClientServer can be managed from anywhere in the network because the Management Console is web-based.

To load up the 2X ThinClientServer configuration page, simply click on the Configuration link in the 2X ThinClientServer program group on the 2X ThinClientServer machine, or load up a browser from anywhere in the network and enter the IP address or hostname of the 2X ThinClientServer machine together with the port number (980), like the following example:

http://thinclientserver.2x.com:980

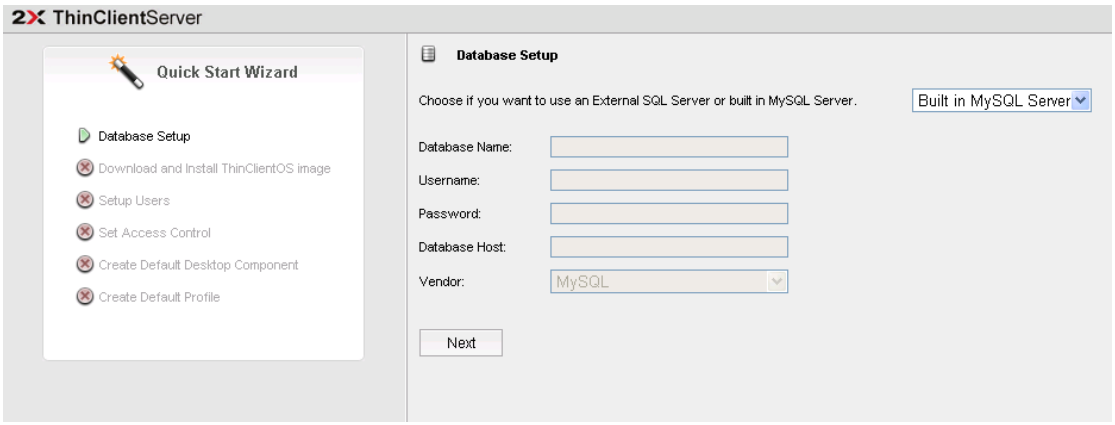
Please note that for a 2X ThinClientServer Management Console to function, it will be necessary to ensure that TCP connections on port 980 to the 2X ThinClientServer can be established.

A helpful Wizard is loaded when you open 2X ThinClientServer for the first time. This is there to configure the essential information needed for 2X ThinClientServer to start working.



Screenshot 16: The Administrator login page for the Management Console.

1. Start by logging into the Management Console using the credentials set during the installation.



Screenshot 17: Setting up the database

2. After login, the 2X ThinClientServer Wizard is started. Choose what type of database you will be using. You can choose to use a local MySQL server or an external MySQL or Microsoft SQL Server database.

   If you choose to use an external database you need to enter the following information

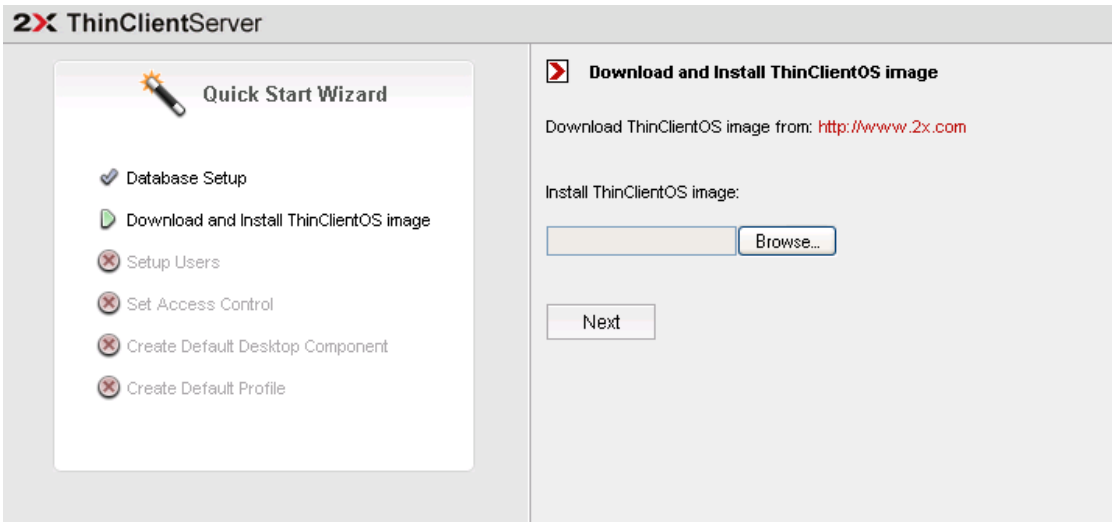
   2.1. **Database Name**: Enter the name of the external database.

   2.2. **User Name**: Enter the username used to log into the database.

   2.3. **Password**: Enter the password used to log into the database.

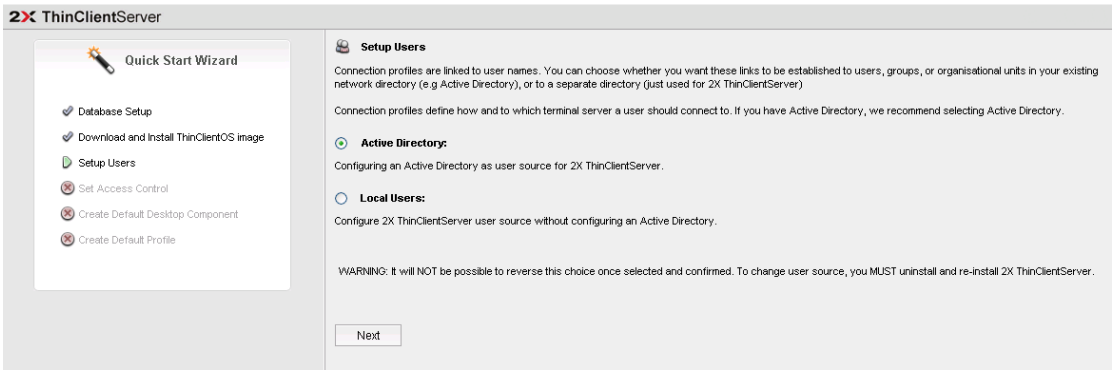
   2.4. **Database Host**: Enter the name or IP of your database server. If you are using an external Microsoft SQL Server database you need to include the name of the service with the IP or name.
   example: 192.0.0.1\SQLEXPRESS

   2.5. **Vendor**: Select the type that matches your external database.



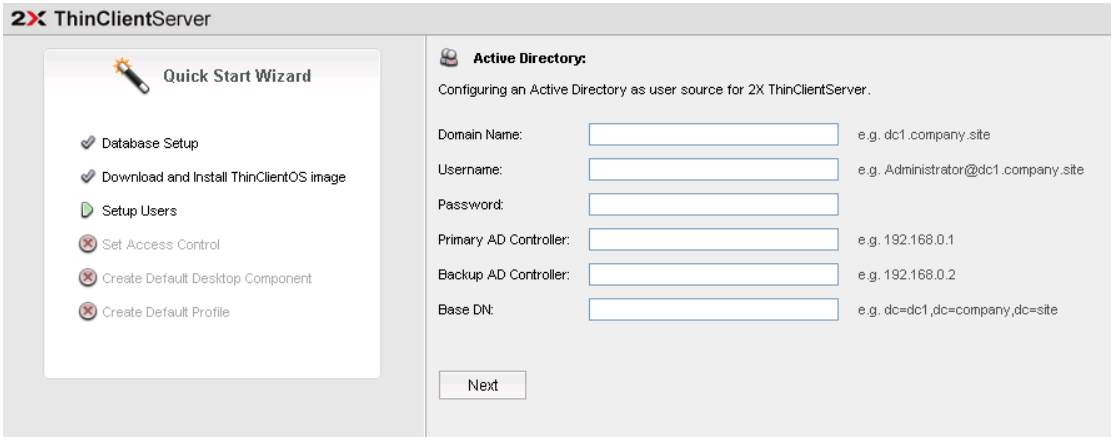
Screenshot 18: Upload a 2X ThinClientOS image

3. Upload a version of 2X ThinClientOS to be used by the thin clients connecting to 2X ThinClientServer. The latest 2X ThinClientOS can be downloaded from the 2X ThinClientServer downloads page.


2X ThinClientServer
Quick Start Wizard
Database Setup
Download and Install ThinClientOS image
Setup Users
Set Access Control
Create Default Desktop Component
Create Default Profile
Setup Users
Connection profiles are linked to user names. You can choose whether you want these links to be established to users, groups, or organisational units in your existing network directory (e.g Active Directory), or to a separate directory (just used for 2X ThinClientServer)
Connection profiles define how and to which terminal server a user should connect to. If you have Active Directory, we recommend selecting Active Directory.
Active Directory:
Configuring an Active Directory as user source for 2X ThinClientServer.
Local Users:
Configure 2X ThinClientServer user source without configuring an Active Directory.
WARNING: It will NOT be possible to reverse this choice once selected and confirmed. To change user source, you MUST uninstall and re-install 2X ThinClientServer.
Next

Screenshot 19: Select the user source for 2X ThinClientServer

4. If you will be using Active Directory to retrieve lists of users, groups, and organisational units, select “Active Directory”. If you will be using local users for the list of users to manage, select “Local Users”. Make sure that the Active Directory accounts are not expired as this might cause problems when the user tries to connect into his thin client.



Screenshot 20: Setting up Active Directory

If you chose to use an Active Directory you need to enter the following information.

4.1. **Domain Name**: Enter the domain name containing the users which will need to be assigned thin client logon rights.

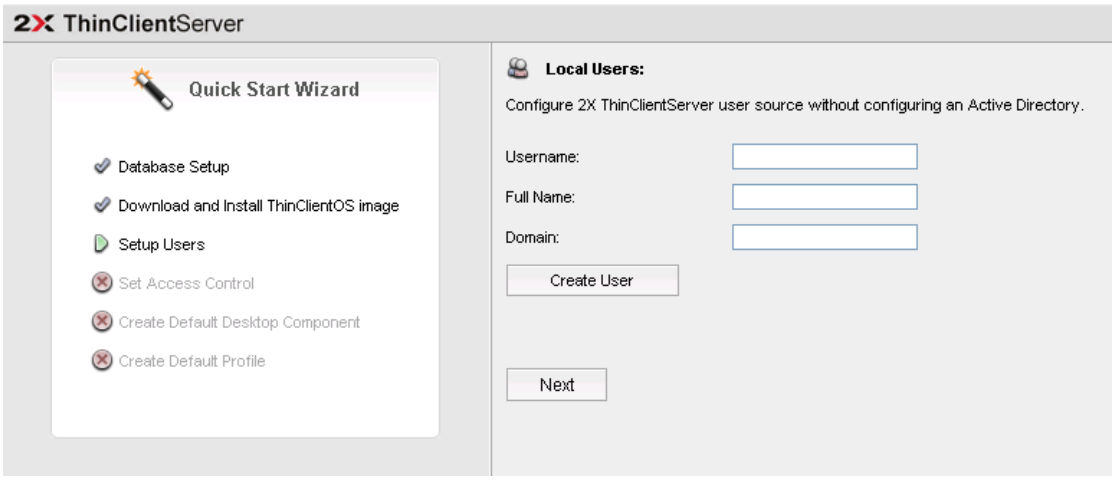
4.2. **Username**: Enter a username residing within the selected domain which has **read** access to the directory. It is recommended to create a separate user for 2X ThinClientServer with a password that never expires. No data will be written to the Active Directory. The username should be in the format user@domain.com.

4.3. **Password**: Enter a password needed by the Active Directory to authenticate the user specified above.

4.4. **Primary AD Controller**: Enter the fully-qualified domain name (or the IP address) of an Active Directory server.

4.5. **Backup AD Controller**: Should the primary Active Directory server fail, a mirror can be specified that contains the same user information and can be used in such situations.

4.6. **Base DN**: The Base DN connection string will automatically be displayed. If you are familiar with LDAP and Active Directory, you can edit this string to filter out results you don't need. A default Base DN is suggested when you type in your domain name. This should let you browse all your Active Directory for users.



Screenshot 21: Setting up Local Users

If you chose to use Local Users you need to enter the following information.

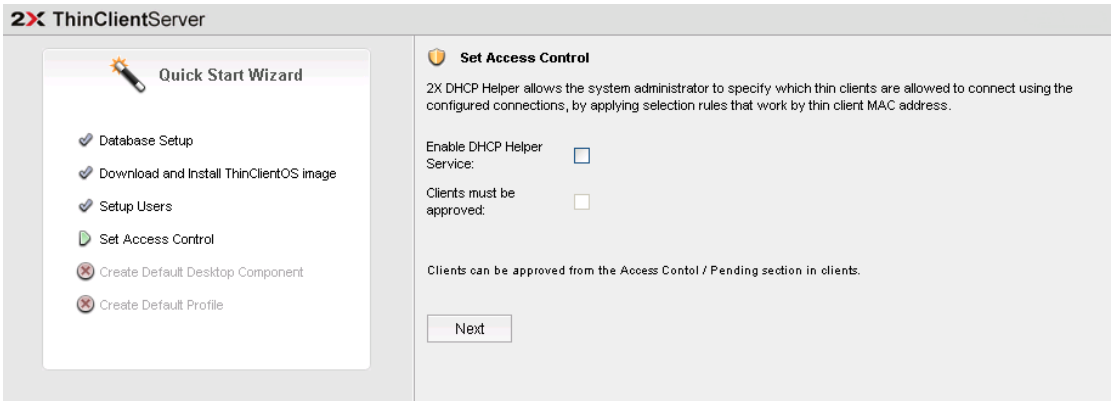
4.7. **Username**: Enter a username to be created locally

4.8. **Full Name**: Enter the full name of the user.

4.9. **Domain**: Enter a domain name for the users. You can have multiple domains for local users.

Click “Create User” to add the new user to the database and repeat the process until all the users you want are created.

Please note that it is NOT possible to change the user list retrieval method after it has been selected.
For a 2X ThinClientServer to retrieve Active Directory information successfully, it will be necessary to ensure that TCP connections on port 389 to the Active Directory Server can be established.

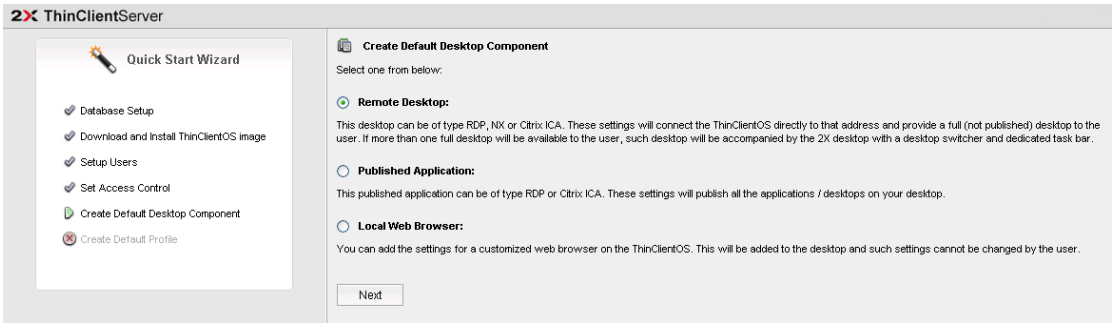

2X ThinClientServer
Quick Start Wizard
Database Setup
Download and Install ThinClientOS image
Setup Users
Set Access Control
Create Default Desktop Component
Create Default Profile
Set Access Control
2X DHCP Helper allows the system administrator to specify which thin clients are allowed to connect using the configured connections, by applying selection rules that work by thin client MAC address.
Enable DHCP Helper Service:
Clients must be approved:
Clients can be approved from the Access Contol / Pending section in clients.
Next

Screenshot 22: Set Access Control

5. 2X DHCP Helper allows the system administrator to specify which thin clients are allowed to connect using the configured connections, by applying selection rules that work by thin client MAC address.

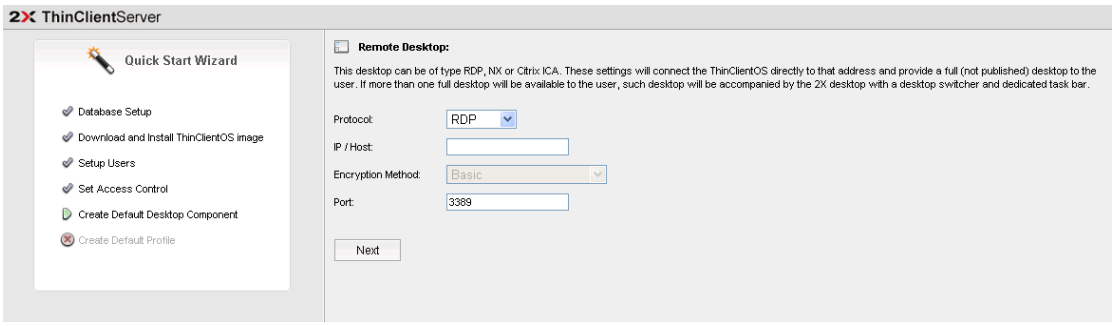
   5.1. **Enable DHCP Helper Service**: Will forward new thin clients on the network to the 2X ThinClientServer to provide the relevant information for the thin clients to boot up.

   5.2. **Clients must be approved**: The administrator must first approve any new clients for them to be able to connect to 2X ThinClientServer and boot.


2X ThinClientServer
Quick Start Wizard
Database Setup
Download and Install ThinClientOS image
Setup Users
Set Access Control
Create Default Desktop Component
Create Default Profile
Create Default Desktop Component
Select one from below:
Remote Desktop:
This desktop can be of type RDP, NX or Citrix ICA. These settings will connect the ThinClientOS directly to that address and provide a full (not published) desktop to the user. If more than one full desktop will be available to the user, such desktop will be accompanied by the 2X desktop with a desktop switcher and dedicated task bar.
Published Application:
This published application can be of type RDP or Citrix ICA. These settings will publish all the applications / desktops on your desktop.
Local Web Browser:
You can add the settings for a customized web browser on the ThinClientOS. This will be added to the desktop and such settings cannot be changed by the user.
Next

Screenshot 23: Create a Default Desktop Component

6. Create a default desktop component for the users to access once they boot up 2X ThinClientOS. The desktop component will be shown on the 2X ThinClientOS desktop.


2X ThinClientServer
Quick Start Wizard
Database Setup
Download and Install ThinClientOS image
Setup Users
Set Access Control
Create Default Desktop Component
Create Default Profile
Remote Desktop:
This desktop can be of type RDP, NX or Citrix ICA. These settings will connect the ThinClientOS directly to that address and provide a full (not published) desktop to the user. If more than one full desktop will be available to the user, such desktop will be accompanied by the 2X desktop with a desktop switcher and dedicated task bar.
Protocol:
RDP
IP / Host:
Encryption Method:
Basic
Port:
3389
Next

Screenshot 24: Add a Remote Desktop

6.1. A **Remote Desktop** can be of type RDP, NX or Citrix ICA. These settings will connect the ThinClientOS directly to that address and provide a full (not published) desktop to the user. If more than one full desktop will be available to the user, such desktop will be accompanied by the 2X desktop with a desktop switcher and dedicated task bar.

6.1.1. Select the protocol type from the drop down list:

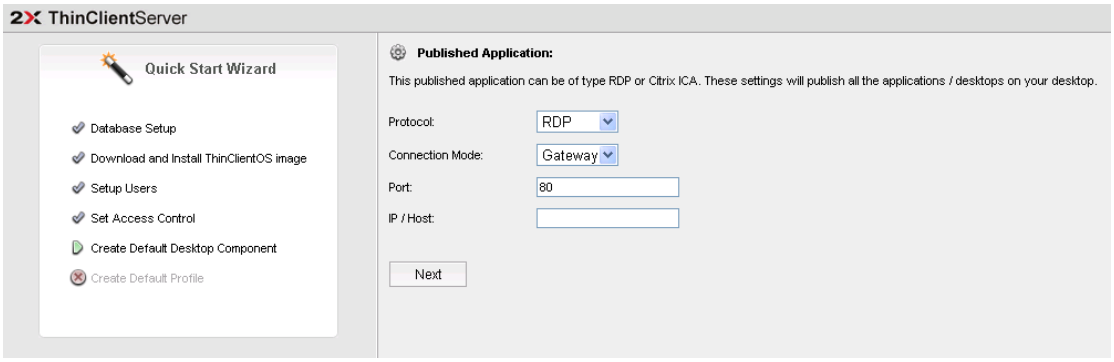
Windows (RDP)

Linux (NX)

Citrix (ICA)

6.1.2. Enter the host addresses of the RDP machine that the user will connect to.

6.1.3. The default port number is automatically set when the protocol type is selected – this value may be customized if necessary.



Screenshot 25: Add a Published Application

6.2. A **Published application** can be of type RDP or Citrix ICA. These settings will publish all the applications / desktops on your desktop.

6.2.1. Select the protocol type from the drop down list:

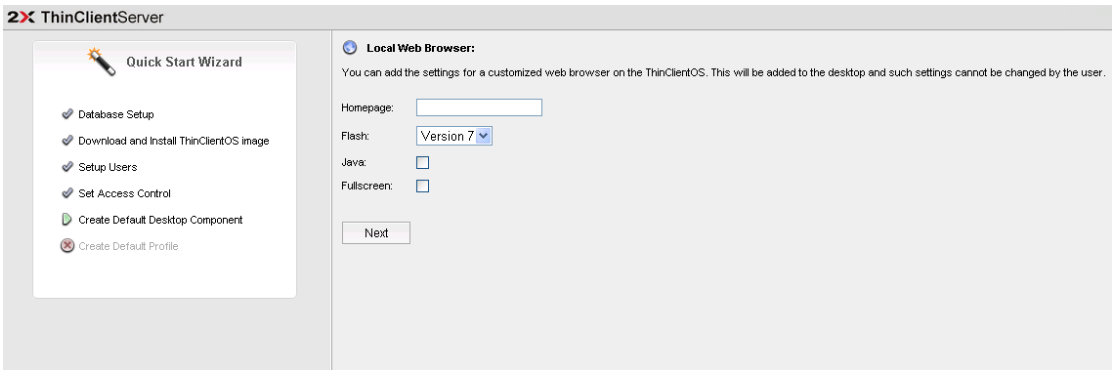
Windows (RDP)

Citrix (ICA)

6.2.2. Select the “Connection Mode” to be used when connecting to your 2X ApplicationServer. Note that this option is not available if you are using a Citrix Server.

6.2.3. The default port number is automatically set when the protocol type is selected – this value may be customized if necessary.

6.2.4. Enter the IP address of the application server.



Screenshot 26: Add a Web Browser

6.3. A **web browser** can be added on the 2X ThinClientOS. This will be added to the desktop and such settings cannot be changed by the user.

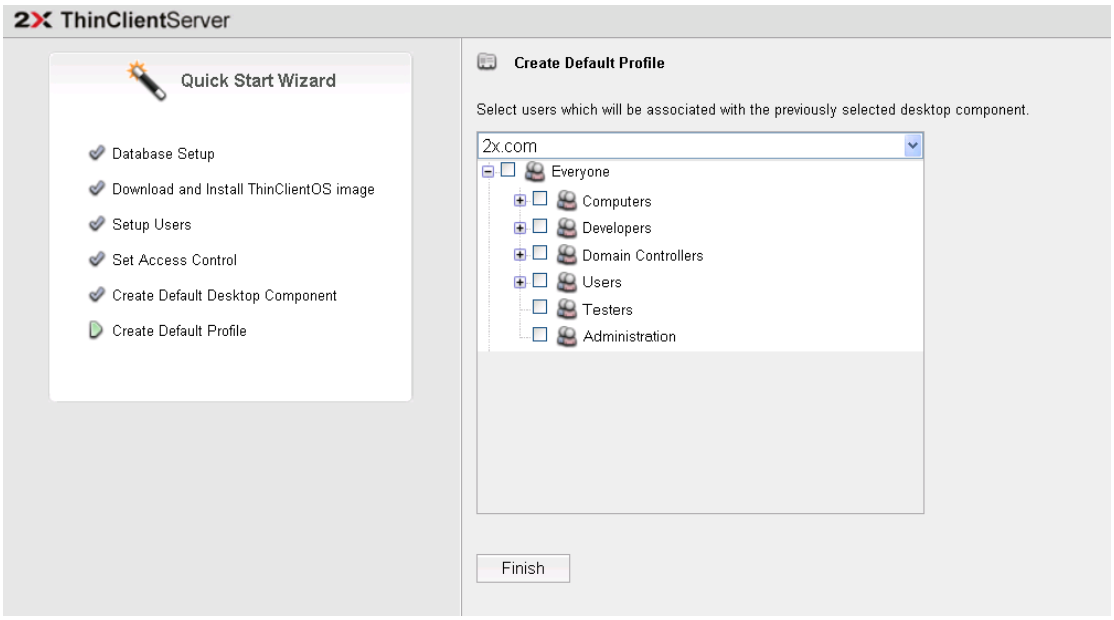
6.3.1. Enter the default homepage for the browser.

6.3.2. Select if you want to add Flash support and which version. Each plug-in will require more memory and local storage on the ThinClientOS.

6.3.3. Select if you want to add support for Java applets.

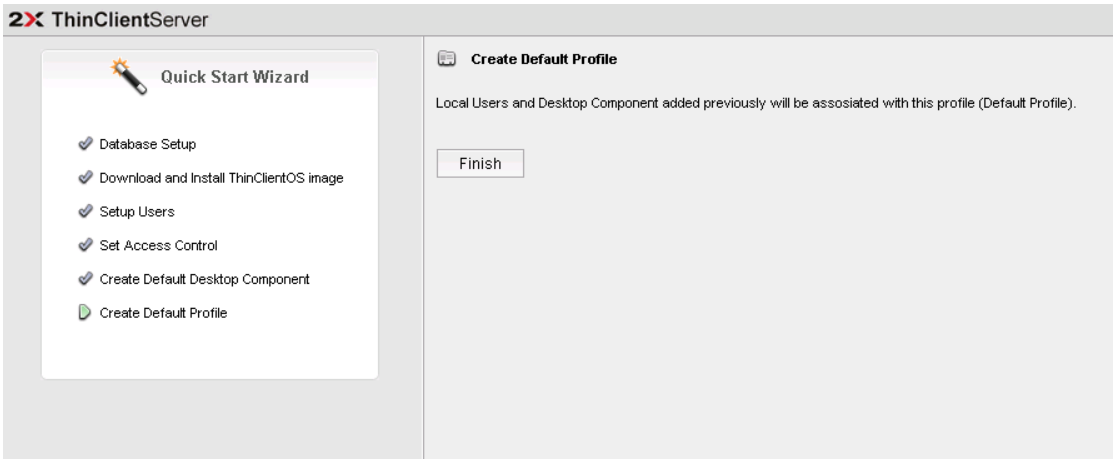
6.3.4. Select if the browser will be loaded in full screen or not.

7. Once all the above settings are configured they will be added to the Default Profile and you can exit the wizard where 2X ThinClientServer will automatically be loaded.



Screenshot 27: Select Users to use the Default Profile

7.1. If you chose to use an Active Directory with your 2X ThinClientServer you will be asked to select the users that will use the Default Profile created.

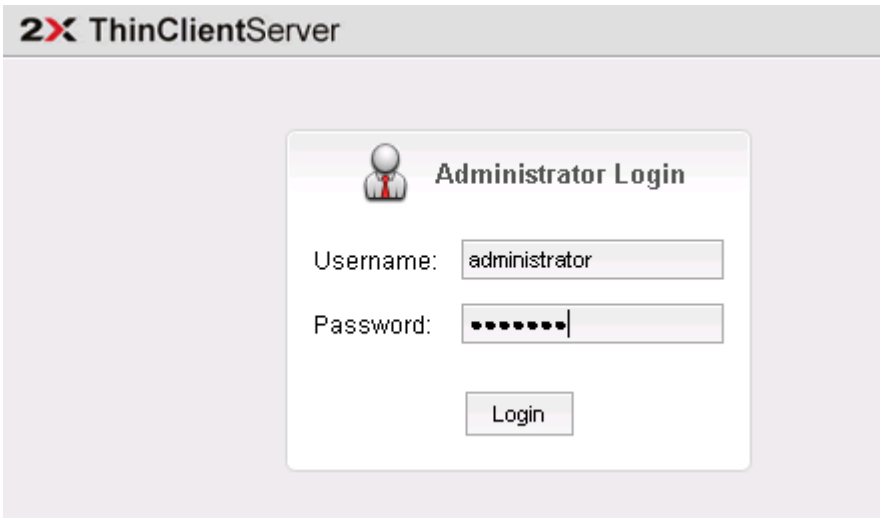


Screenshot 28: Create the Default Profile for the Local Users already created

7.2. If you have chosen to use Local Users, the Default Profile will be used by the users you created in the Local Users page.

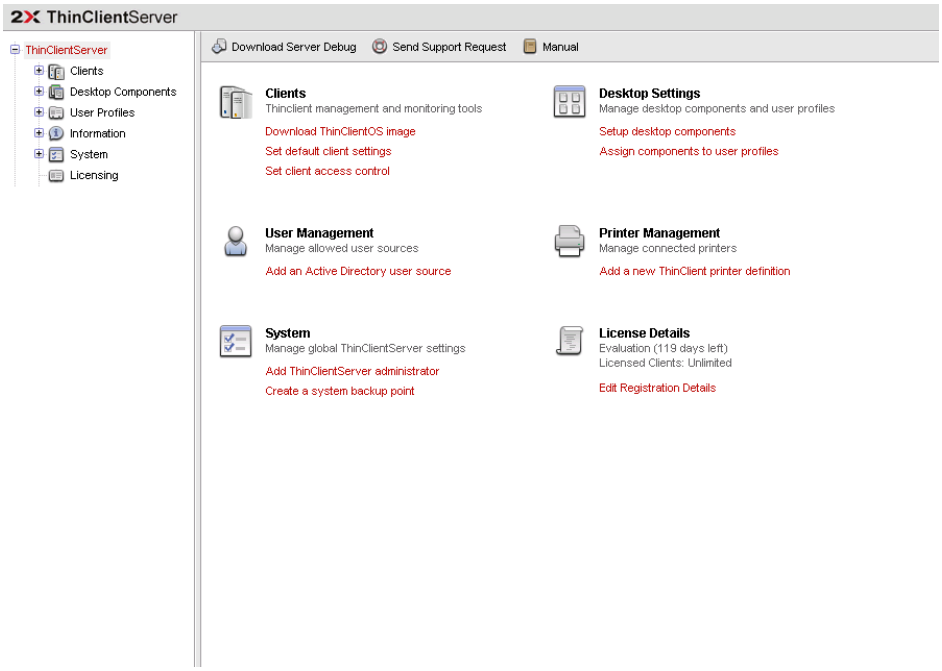
Configuring 2X ThinClientServer

Log into 2X ThinClientServer



Screenshot 29: The Administrator login page for the Management Console.

1. Type in the username and password for the administrator user who will have the rights to configure 2X ThinClientServer.



Screenshot 30: Management Console main information screen

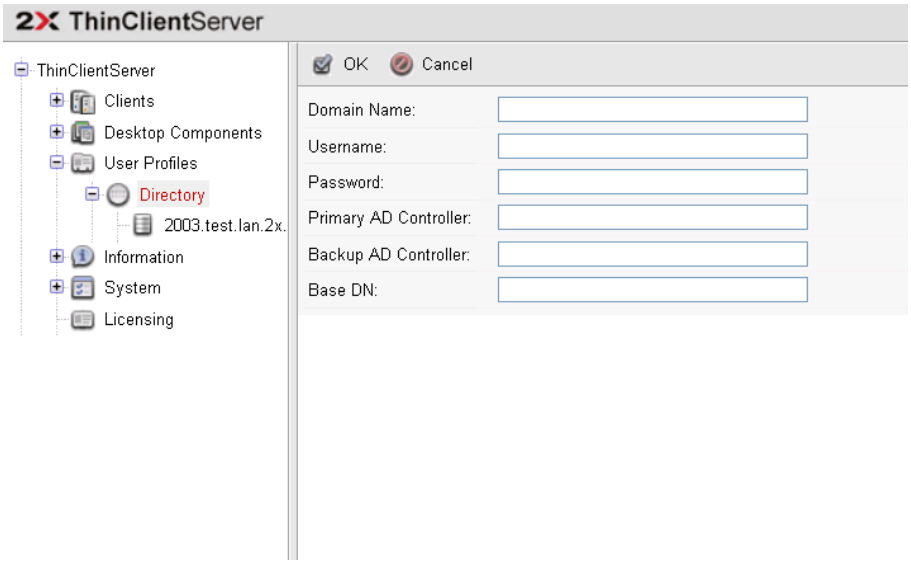
2. After logging into the 2X ThinClientServer you will be presented with the Management Console main information screen.

The warning icons in the centre of the page indicate the configuration procedures that must be performed prior to concluding the installation procedure.

Configuring the Directory Server

If you selected "Local Users" as your User Source,, the Management Console main screen will not prompt you to perform this procedure, and you will be able to successfully configure 2X ThinClientServer without configuring a Directory Server.

1. Click on the “Directory” node under “User Profiles” from the sidebar. This will show existing Directories. If you would like to create a new Directory click on “New Directory”.



Screenshot 31: Configuring the Directory Server.

1.1. **Domain Name**: Enter the domain name containing the users which will need to be assigned thin client logon rights.

1.2. **Host**: Enter the fully-qualified domain name (or alternatively the IP address) of an Active Directory server.

1.3. **Host Mirror**: Should the primary Active Directory server fail, a mirror can be specified that contains the same user information and can be used in such situations.

1.4. **Username**: Enter a username residing within the selected domain which has **read** access to the directory. It is recommended to create a separate user for 2X ThinClientServer with a password that never expires. No data will be written to the Active Directory. The username should be in the format user@domain.com.

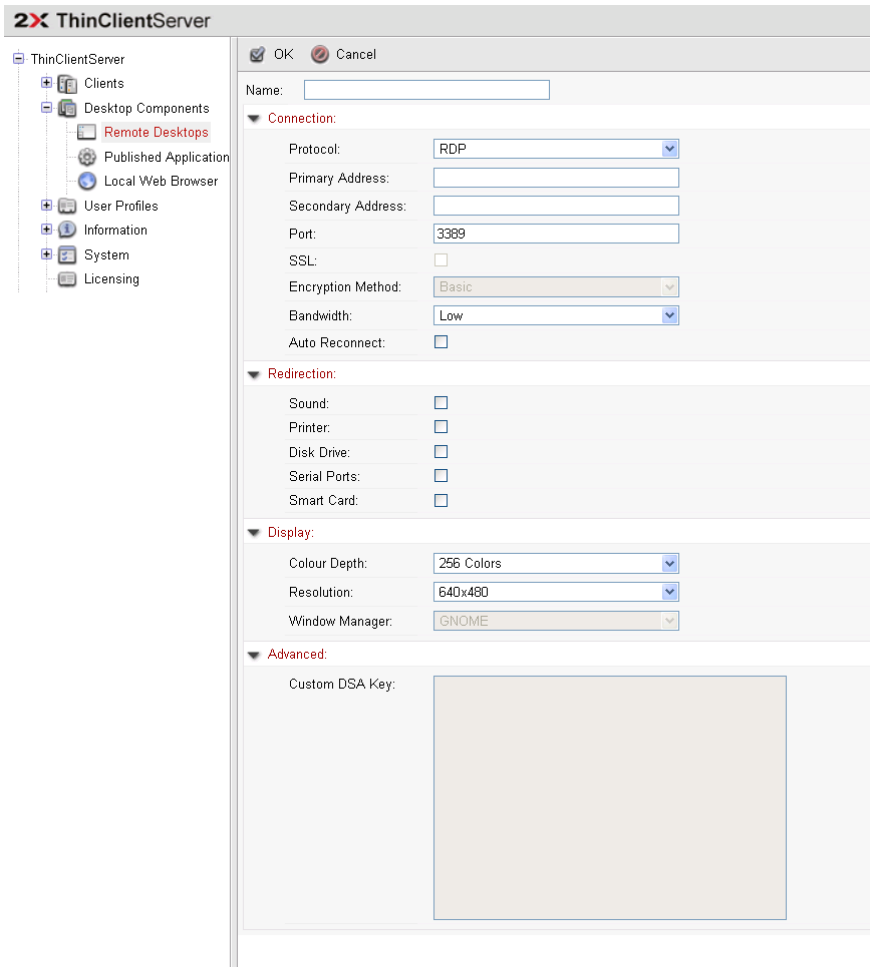
1.5. **Base DN**: The Base DN connection string will automatically be displayed. If you are familiar with LDAP and Active Directory, you can edit this string to filter out results you don't need. A default Base DN is suggested when you type in your domain name. This should let you browse all your Active Directory for users.

1.6. **Password**: Enter a password needed by the Active Directory to authenticate the user specified above.

1.7. Click “OK” when ready.

Desktop Components

1. You can add a Remote Desktop. This desktop can be of type RDP, NX or Citrix ICA. These settings will connect the ThinClientOS directly to that address and provide a full (not published) desktop to the user. If more than one full desktop will be available to the user, such desktop will be accompanied by the 2X desktop with a desktop switcher and dedicated task bar. To start adding Remote Desktops, choose the “Remote Desktops” node under “Desktop Components” in the sidebar.



Screenshot 32: Add the settings for a direct connection to a Terminal Server.

1.1. Enter a name for the desktop. If more than one item is available to the user, the name will be used on the 2X desktop so that the user can identify which Terminal Server he/she will be connecting to.

1.2. Select the protocol type from the drop down list:

Windows (RDP)*

Linux (NX)**

Citrix (ICA)***

Please note that for a Windows (RDP) Full Desktop Session to run successfully, it will be necessary to ensure that TCP connections on port 3389 to the Windows Terminal Server can be established.

Please note that for a Linux (NX) Session to run successfully, it will be necessary to ensure that TCP connections on port 22 to the 2X TerminalServer can be established.

Please note that for a Citrix (ICA) Full Desktop Session to run successfully, it will be necessary to ensure that TCP connections on port 1494 to the Citrix Presentation Server can be established.
The "Citrix (ICA)" and "Citrix Published Applications" protocols are only available in the Enterprise Edition.
This connection will bypass the Citrix load balancing and provide direct connectivity to the server. If you wish to use Citrix load balancing configure a new published app.
If you use Citrix (ICA) you can enable a River Cipher encryption for added security.

1.3. Enter the server addresses and "Port Number" The "Primary Address" may be a hostname or an IP address. The default port number is automatically set when the protocol type is selected – this value may be customized if necessary. The "Secondary Address" can be added to provide redundancy to a secondary NIC card or Terminal Server. This address will be used if the user selects "Reconnect" after the session has been disconnected.

1.4. Enable SSL to encrypt the data that is being passed for communication. Specify the speed of you bandwidth that you will use to connect to your remote desktops. Enable "Auto Reconnect" if you would like to automatically reconnect to you remote desktop if a connection is lost.

1.5. Specify the "Redirection Settings"

You may specify which redirection facilities (sound, disk, printing, serial ports and smart card) will be available to this protocol.

Click on the “OK” button when ready.

1.6. Specify the “Display Settings”

You may select the desired colour depth from the drop down list.

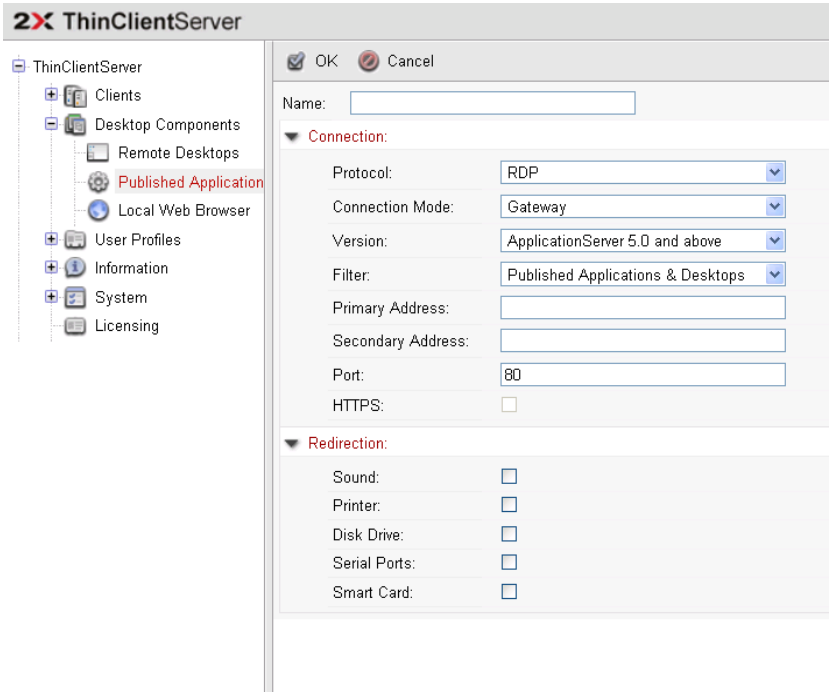
You may select from a number of different resolutions from the drop down list

You may select the desired window manager for the NX protocol type. Select Gnome or KDE.

1.7. If you use the NX protocol to connect to an NX server, you can use a custom DSA key to authenticate users connecting to the NX server.

It will be necessary to repeat this procedure for each terminal server that you wish to support.
In a load-balancing installation of full desktops, you will only be required to set up one full desktop setting, directed at the load balancer. The load balancer will in turn handle session distribution to its member servers.

2. Click on “Published Applications” node under “Desktop Connections.



Screenshot 33: Add the settings for a direct connection to a Terminal Server.

2.1. Enter a name for the source of your published applications and/or desktops. This name will not be seen in the ThinClientOS.

2.2. Select the protocol type

*Windows (RDP)**

*Citrix (ICA)***

* *Please note that for a Windows (RDP) Published Applications Session to run successfully, it will be necessary to ensure that TCP connections on port 80 to the Windows Terminal Server can be established.*
Please note that 2X ApplicationServer MUST be installed on the network to enable 2X (RDP) Published Applications.

** *The "Citrix Published Applications" protocols are only available in the Enterprise Edition.*
This connection will use the Citrix load balancing and provide a list of published desktops or applications as provisioned on the Citrix Servers. Please make sure that the NFuse/PNagent addons have been installed correctly on your Citrix Servers.

2.3. Select the "Connection Mode" and the version of your 2X ApplicationServer you are running.

2.4. You can choose to filter the published items that are displayed to the user. You can display the published applications, published desktops or both.

2.5. Select the server address and "Port Number". The "Primary Address" may be a hostname or an IP address. The default port number is automatically set when the protocol type is selected – this value may be customized if necessary. The "Secondary Address" can be added to provide redundancy to a secondary NIC card or Terminal Server.

2.6. If you specify the ICA (Published Applications) protocol type you can choose to use "HTTPS" if it is required by your Citrix Administrator.

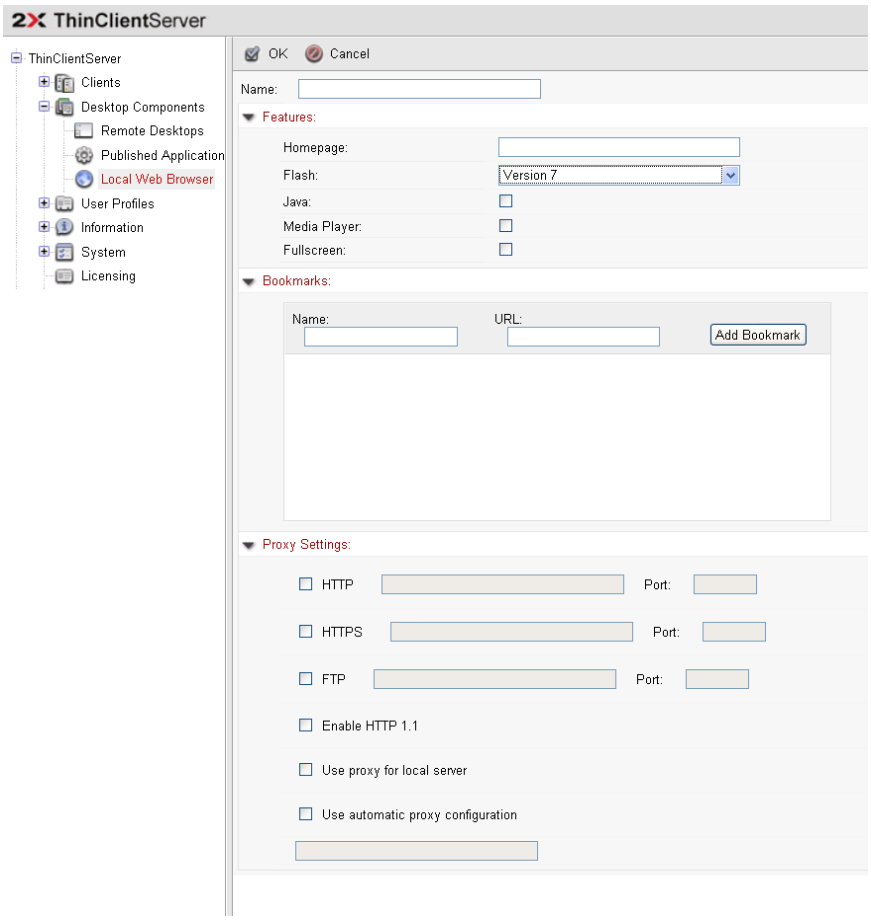
2.7. Specify the Redirection Settings

You may specify which redirection facilities (sound, printer, disk, serial ports and smart cards) will be available to this protocol.

Click on the "OK" button when ready.

It will be necessary to repeat this procedure for each machine providing a list of applications that you wish to support.

3. Next you can add the settings for a customized web browser on the ThinClientOS. This will be added to the desktop and such settings cannot be changed by the user. Make sure that the Thin Client has enough RAM to accommodate the multiple web pages that are displayed since more memory will be required and it depends on the web pages being rendered.



Screenshot 34: Add the settings for a local web browser on the thin client.

3.1. Enter a name for the web browser. This name will be used on the 2X desktop.

3.2. Set the default homepage for the browser.

3.3. Select if you want to add Flash support and which version. Each plug-in will require more memory and local storage on the ThinClientOS.

3.4. Select if you want to add support for Java applets.

3.5. Select if you want to enable the Media Player inside the browser.

3.6. Select if the browser will be loaded in full screen or not.

3.7. To add bookmarks to the browser simply type in a “Name” for the site (example: 2X Software) and its “URL” (example: http://www.2x.com). Then click on “Add Bookmark” to add the site.

3.8. To delete a bookmark simply click on the delete icon next to the bookmark or press “Delete” from your keyboard.

3.9. If you require the use of a proxy server enter the appropriate settings inside each text field.

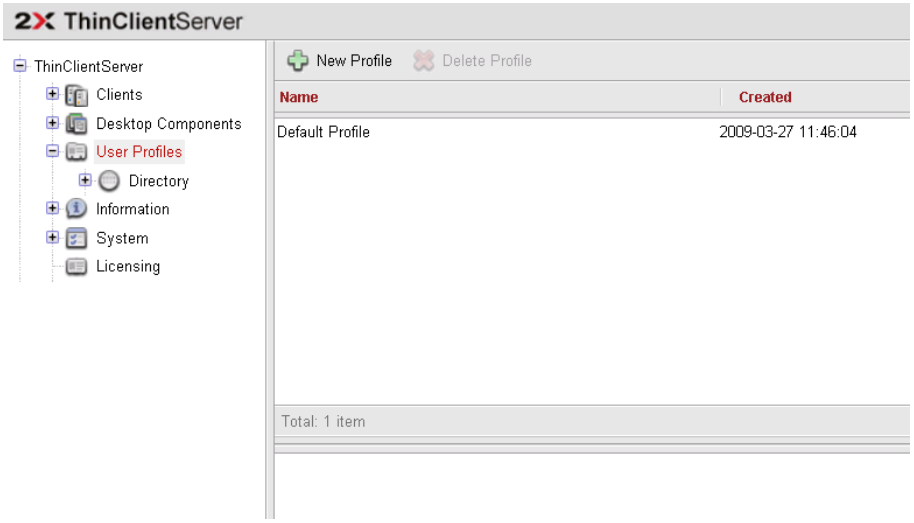
3.10. Note the formatting of wild cards to omit addresses to be passed to the proxy server.

3.11. Click on “OK” when finished.

User Profiles

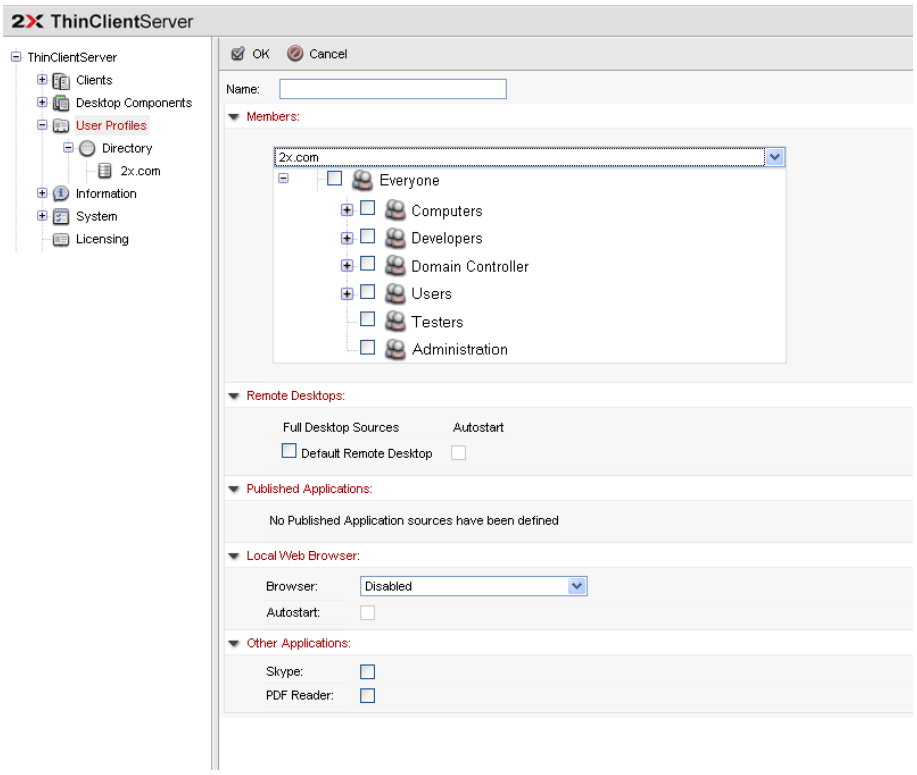
1. To add a new user profile click on the “User Profiles” node and the main window will show a list of all the existing profiles.

   1.1. Click the “New Profile” icon.



Screenshot 35: List of configured profiles.

1.2. A new form will load which contains the different sections needed for you to add a new profile



Screenshot 36: Adding a new profile.

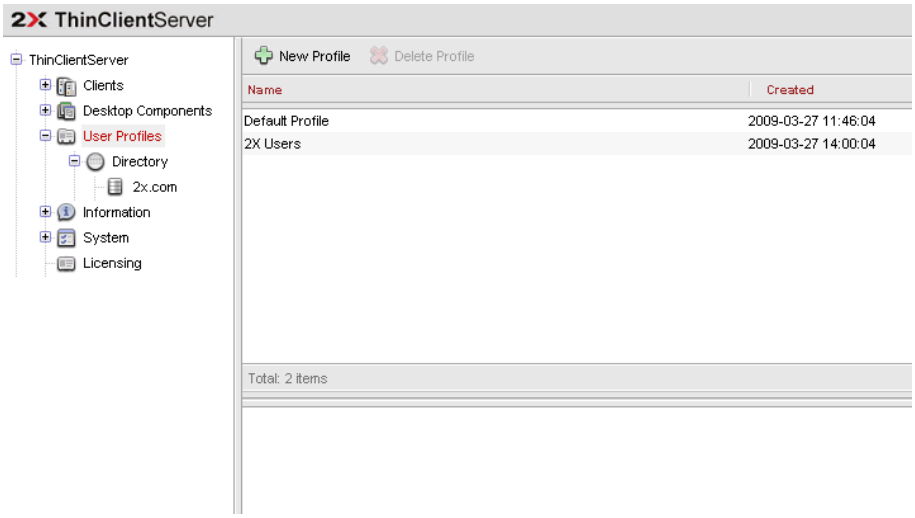
1.2.1. Start by giving the user profile a unique name that can be used to quickly identify the different profiles in the list.

1.2.2. Select which users listed, from the Active Directory, will be included in the profile by selecting the user and checking their respective checkbox.

1.2.3. You can now select which remote desktops, published applications and local web browsers will be available to the users.

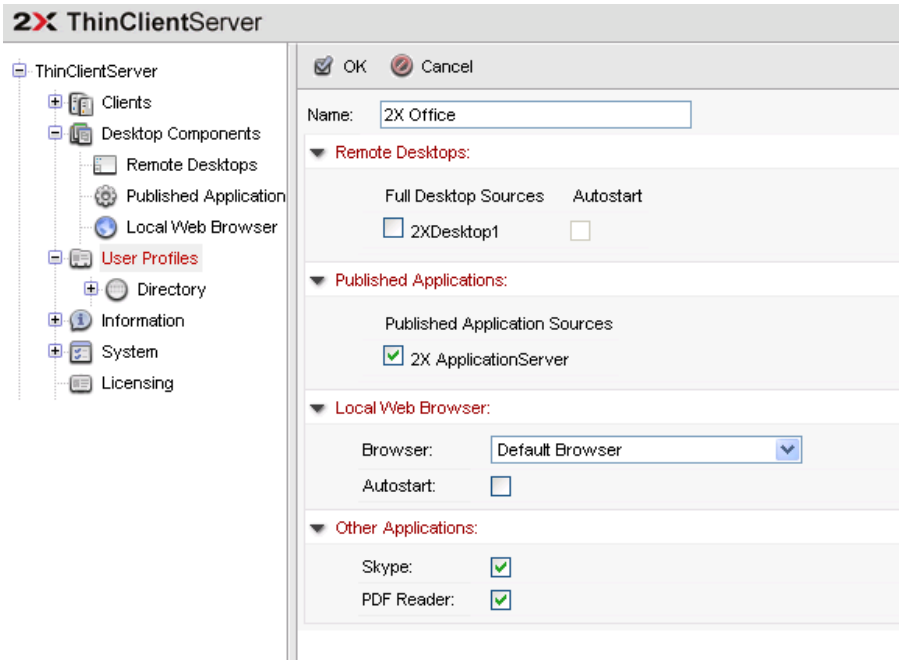
1.2.4. You can add applications such as Skype and a PDF Reader to be accessible by the users on the 2X ThinClientOS

1.2.5. To add the new User Profile click on “OK” and you will be redirected to the main User Profiles page where you will be able to see the new User Profile added.



Screenshot 37: New User Profile Added

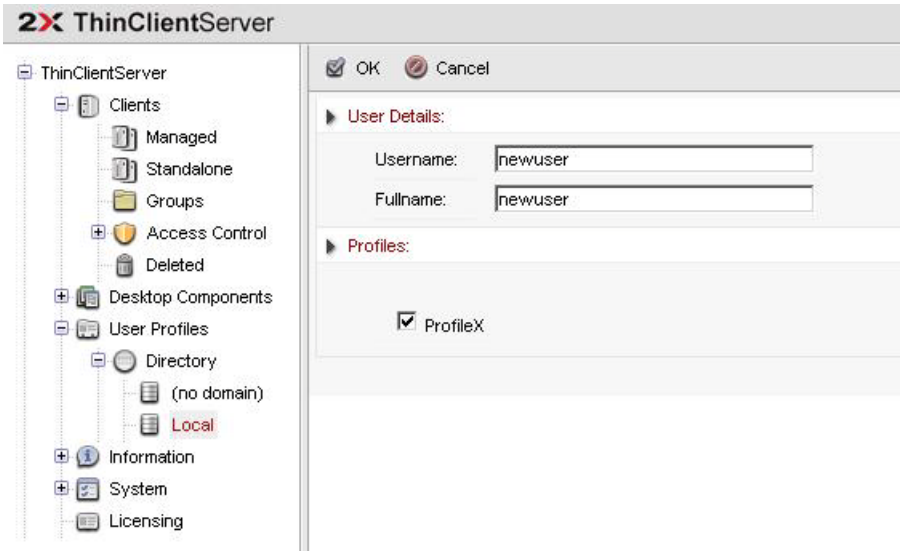
If you selected “Local Users” as the user source, the user interface presented will be as follows:



Screenshot 38: Adding a User Profile with local users.

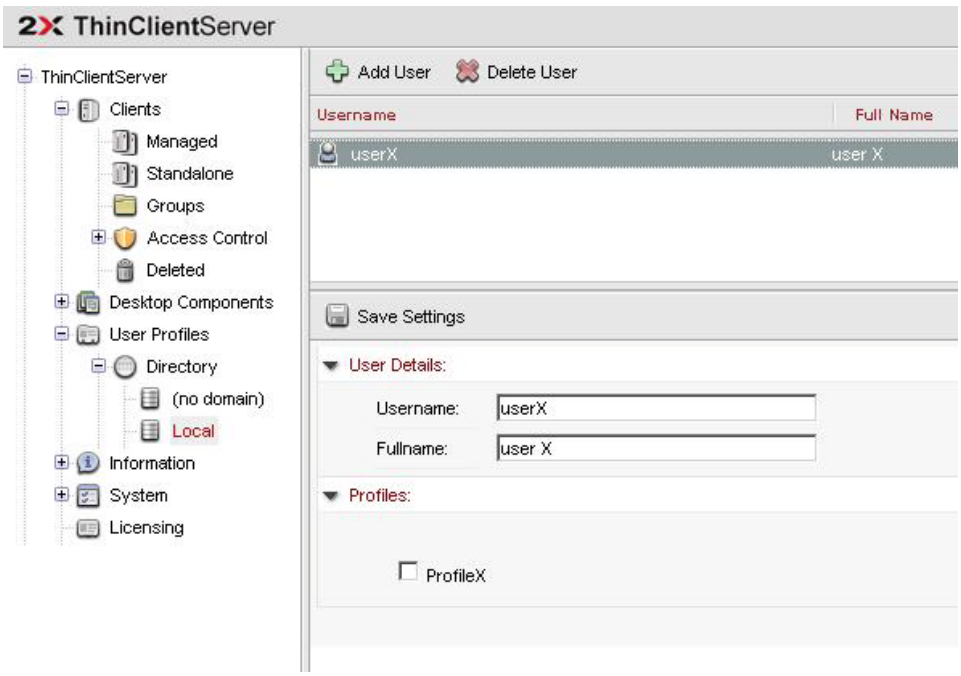
"Local Users" are stored in the central database of the ThinClientServer. They have got nothing to do with Windows/Linux local user accounts and credentials.

1.3. To add a new user simply inside the Directory in which the user will be added and click on "New User". Then enter the username, the full name and check the Profile box where you want the user to join.



Screenshot 39: Adding a new Local User

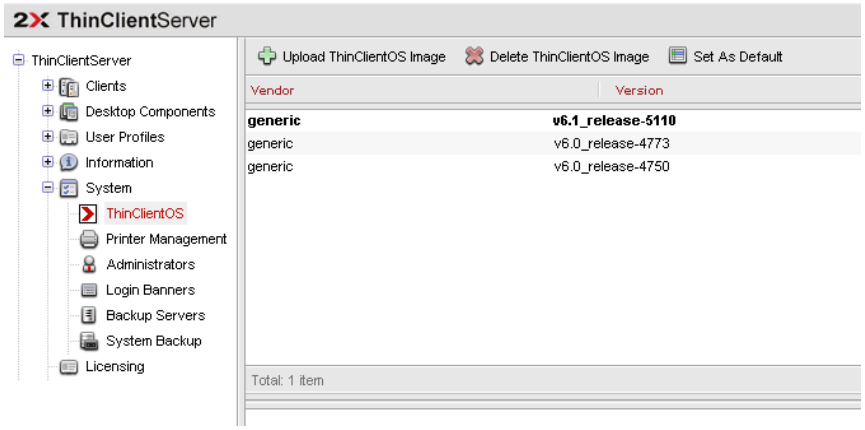
1.4. To add a user to a local profile go to User page from "User Profiles" > "Directory" > *your directory* and check the box where you want the user to join.



Screenshot 40: Adding an existing user to a User Profile.

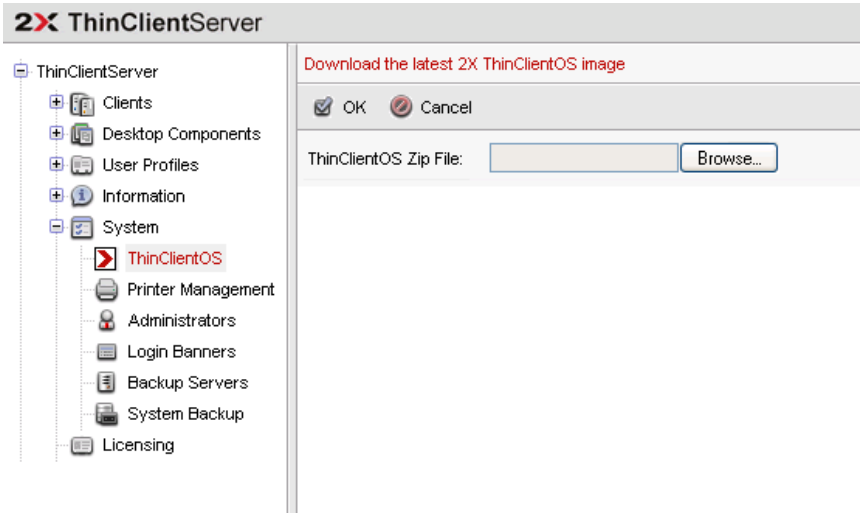
2X ThinClientOS

1. To add a new version of the 2X ThinClientOS click on “ThinClientOS” node under the “System” node from the sidebar. Click on “Upload ThinClientOS Image” to upload a new 2X ThinClientOS. After an image is uploaded you can use the “Set as Default” button to update the default settings for the OS. Thin clients using a specific OS and not the default settings will not be effected.



Screenshot 41: 2X ThinClientOS

1.1. Click the “Browse…” button to locate and select the file downloaded. Click on “OK” to install the new image. Once the file is uploaded successfully it will show up as a new item in the “ThinClientOS” section of the Management Console. Note that a link is provided to download the latest 2X ThinClientOS from http://www.2x.com



Screenshot 42: Browse for a 2XThinClientOS file to upload.

Please note that it may take some time to install the file, especially if the 2X ThinClientServer machine is connected to this machine over a slow link. It may be necessary to configure a longer session timeout to allow for this eventuality.

Preparing the Thin Clients

Introduction

After you have installed the 2X ThinClientServer, you can proceed to install/configure a thin client or computer to boot 2X ThinClientOS. 2X ThinClientOS can be booted from a storage device (CD-ROM, hard disk, USB or flash disk) or it can boot over the network (PXE or Etherboot). Etherboot works very similar to PXE, however it does not rely on the BIOS of the computer to boot via the network but on a small boot image copied to a CD-ROM, floppy disk, a hard disk, USB disk or even the ROM of a network card.

For more information about the boot methods and how 2X ThinClientServer works, see Introduction to 2X ThinClientServer.

The 2X ThinClientOS is provided in the form of 2 files and can be downloaded from the http://www.2x.com/ website. The 2X ThinClientOS is provided as:

1. an ISO file to burn on a CD-ROM. The file name is called 2XThinClientOS_<version number>.iso. This can be used to:
   - boot from the network
   - install on to the hard disk or flash disk
   - install to a bootable USB disk
   - boot from CD
   - boot into a set of network diagnostic tools
2. a ZIP file to be installed onto 2X ThinClientServer or else to be extracted to the TFTP server directory. 2X ThinClientOS will then be downloaded and booted by thin clients configured to boot via PXE or Etherboot. The file name is called 2XThinClientOS_<versionnumber>.zip.

   This same file is also used to update the version on the 2X ThinClientServer, so that thin clients that have 2X ThinClientOS installed on the hard disk can automatically download the latest version.

Thin Client System Requirements

- Any thin client/computer with a Pentium processor or higher
- 32 MB of RAM is needed for CD-ROM USB or hard disk
- 64 MB of RAM is needed for PXE or Etherboot
- 450 MHz processor or higher
- If you want to boot via PXE, ensure that your thin client device supports PXE booting. Not all thin clients or computers can boot via PXE
- If you want to boot via USB disk, ensure that your thin client device supports USB disk booting. Not all thin clients or computers can boot via USB disks
- If you want to boot via Etherboot, ensure that your thin client device has a supported network card. A list of supported network cards can be found here: http://www.etherboot.org/db/

Configuring a thin client to boot from a hard disk, USB or flash disk (CD install)

Be sure to make a backup of all data before attempting to install.

Step 1: Downloading the thin client OS

Download the 2X ThinClientOS image as an ISO file, called 2XThinClientOS_<version number>.iso from:

http://www.2x.com/thinclientserver/

Step 2: Burning the ISO image to a CD-ROM

Now burn the downloaded image to CD-ROM. To do this:

- If using Windows XP and Nero Burning ROM, simply go to menu “Recorder”, choose option “Burn Image…”, and select the downloaded .ISO file.
- If using Linux & K3B, simply go to Burn CD. Select the ISO image and click 'Start'.
- Use good quality CD-ROM (avoid CD-RW) media which is known to work with your CD-ROM drive.
- Burn the CD as a finalised single session using track-at-once (TAO).

- Enable Buffer-Underrun Protection.
- Ensure that the downloaded ISO file is not in use (for example by anti-virus software).
- Set the burning speed to match the recommended speed specified by the CD-ROM media and gradually lower the speed if problems are encountered reading the CD-ROM.
- Ensure that the system has enough free resources to complete the burning process.
- If problems persist try to boot from the CD-ROM drive used to burn the ISO.

Step 3: Configure the thin client to boot from CD-ROM

After you have burned the CD-ROM, insert the CD-ROM into the CD-ROM drive of the thin client / computer. Now ensure that the thin client will attempt to boot from the CD-ROM and not from another storage device. Go into the computers BIOS and check that the boot sequence starts with the CD-ROM drive. You can choose to keep running the application from the CD or else install it to a hard disk.

Step 4a: Installing 2X ThinClientOS on the hard disk

Be sure to make a backup of all important data before installing 2X ThinClientOS.

As soon as the computer boots, follow these steps to install the image to the hard disk:

1. Choose “2X ThinClientOS Installer” using the cursor keys and press ENTER.
2. Click OK on the welcome message.
3. The installer will check if you have free unpartitioned space on the hard disk – if it finds free space, it will automatically create a partition of 32 megabytes and install 2X ThinClientOS.
4. If it does not find unpartitioned space, it will prompt you whether you wish to:
   a) Overwrite an existing partition – this option will allow you to select an existing partition, which the installer will use to install 2X ThinClientOS.

      Important: All data on this partition will be erased.

   b) Resize a partition – this option will cause the installer to attempt to resize an existing partition by reducing it by 32 MB, and then creating a new partition for the 2X ThinClientOS.

c) Erase entire hard disk – this option will erase all data on the hard disk and create a single partition for 2X ThinClientOS.

d) Manually partition – this option will start a partitioning program and allow you to re-partition the hard disk. After the partitioning is complete, the installer will allow you to select which partition to install 2X ThinClientOS on.

5. The installer will now prompt you to install a boot loader menu. This allows you to select, at boot-time, whether to boot into 2X ThinClientOS or whether to boot into the Operating System which was originally installed.
6. The installer will now copy the 2X ThinClientOS image to the hard disk. After it is finished, the machine must be rebooted.

Step 4b: Installing 2X ThinClientOS on a USB disk

Be sure to make a backup of all important data before installing 2X ThinClientOS on both the USB and hard disk.

As soon as the computer boots (without the key inserted), follow these steps to install the image to the USB disk:

1. Choose “2X ThinClientOS Installer” using the cursor keys and press ENTER.
2. Insert the USB disk in one of the USB ports available.
3. The installer will then scan the system for available installation devices. The local hard disk of the machine will be listed also.
4. Click OK on the welcome message.
5. Select the appropriate USB disk. Be careful not to select the wrong device. Use the detected size as an indicator if the device has been detected correctly.
6. The installer will now copy the entire 2X ThinClientOS installation CD to the USB disk. The USB disk will function exactly like a bootable CD but will have the ability to save and cache data locally. After it is finished, the machine must be rebooted.

Step 5: Configure the thin client to boot from the hard disk/USB

After you have installed 2X ThinClientOS, you must now ensure that the thin client / computer will boot from the new disk. Go into the computer’s BIOS and check that the boot sequence starts with the hard disk or USB depending on which type of installation you have just performed.

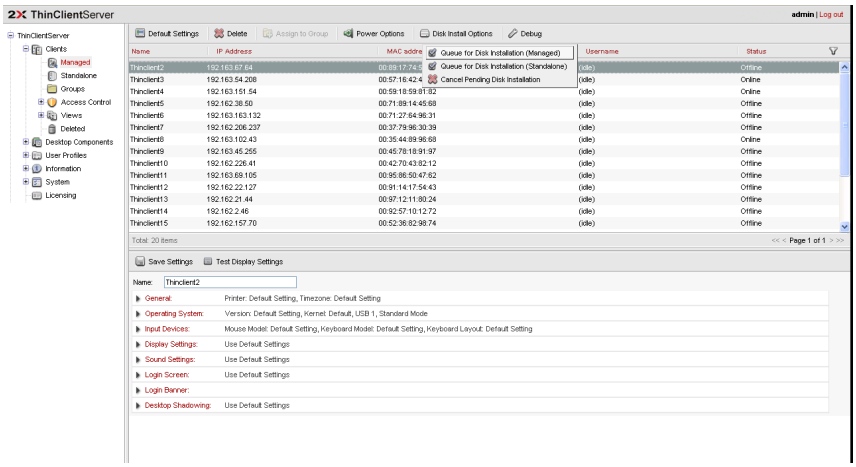
Note that the 2X ThinClientOS will automatically update itself with

the latest version, if you have installed a later version of 2X ThinClientOS on the 2X ThinClientServer.

Configuring a thin client to boot from a hard disk, USB or flash disk (Network install)

Be sure to make a backup of all important data before installing 2X ThinClientOS on both the USB and hard disk.

1. Configuring the thin client to boot via PXE: Enter the BIOS of the thin client / computer and configure it to boot via PXE. Reboot the thin client / computer, enter the BIOS, and check for a boot sequence entry. For more information, check the documentation of your thin client / computer.
2. Booting the thin client for the first time: You will need to boot the thin client so that 2X ThinClientServer can add the thin client to the list of detected thin clients. Once the thin client has booted successfully and displays the login screen, you are ready to move to step 3.
3. Flagging the thin client for a disk install



Screenshot 43: List of thin clients

3.1. Select the thin client(s) where you would like to have the 2X ThinClientOS installed and click on “Install to Disk” > “Queue for Disk Installation”. This will change its status to “Pending Disk Installation”.

To cancel an installation select the thin client that is going to be effected and click on "Install to Disk" > "Cancel Pending Disk Installation"

3.2. You must now reboot the thin client to initialise the installation procedure. The thin client will again boot over the network, but will receive new parameters instructing it to perform a hard disk installation.

3.3. The installer will check if you have free unpartitioned space on the hard disk – if it finds free space, it will automatically create a partition of 32 megabytes and install 2X ThinClientOS. If you insert a USB key at this stage, the option to create a USB key install is available.

3.4. If it does not find unpartitioned space, it will prompt you whether you wish to:

3.4.1. Overwrite an existing partition – this option will allow you to select an existing partition, which the installer will use to install 2X ThinClientOS.

Important: All data on this partition will be erased.

3.4.2. Resize a partition – this option will cause the installer to attempt to resize an existing partition by reducing it by 32 MB, and then creating a new partition for the 2X ThinClientOS.

3.4.3. Erase entire hard disk – this option will erase all data on the hard disk and create a single partition for 2X ThinClientOS.

3.4.4. Manually partition – this option will start a partitioning program and allow you to re-partition the hard disk. After the partitioning is complete, the installer will allow you to select which partition to install 2X ThinClientOS on.

3.5. The installer will now prompt you to install a boot loader menu. This allows you to select, at boot-time, whether to boot into 2X ThinClientOS or whether to boot into the operating system which was originally installed.

3.6. The installer will now copy the 2X ThinClientOS image to the hard disk. After it is finished, the machine must be rebooted.

4. Configure the thin client to boot from the hard disk or USB disk

4.1. After you have installed 2X ThinClientOS, you must now ensure that the thin client / computer will boot from the appropriate boot device. Go into the computer's BIOS and check that the boot sequence starts with the hard disk or USB depending on the target destination.

Note that the 2X ThinClientOS will automatically update itself with the latest version if you have installed a later version of 2X ThinClientOS on the 2X ThinClientServer.

Configuring a thin client to boot via PXE

Step 1: Download the 2X ThinClientOS image

Download the 2X ThinClientOS image as a ZIP file, called 2XThinClientOS_<version number>.zip from:

http://www.2x.com/downloads

Step 2: Copy the image to a 3rd party TFTP Server (optional)

If you are using a 3rd party TFTP server instead of the one already bundled with 2X ThinClientServer, please note the following:

Upon boot, the thin client must find a TFTP server and download the 2X ThinClientOS image. Therefore you must extract the contents of the "PXE" folder found within the downloaded 2XThinClientOS ZIP file to the directory from which the TFTP server serves files. The industry default is X:\tftproot. To install the remaining files needed during the boot procedure, ensure you install the new 2X ThinClientOS image by following the section entitled "Installing a new 2X ThinClientOS" later on in this chapter.

Note that 2X ThinClientServer will automatically install it's own TFTP Server to allow for this functionality without additional configuration from the user. This step is only necessary in the case a TFTP Server is already installed on the 2X ThinClientServer machine and providing services to the network, or if you intend to use a TFTP server already commissioned elsewhere on your network.

Step 3: Configuring thin clients to boot via PXE

Now you need to enter the BIOS of the thin client / computer and configure it to boot via PXE. Reboot the thin client / computer, enter the BIOS, and check for a boot sequence entry. For more information, check the documentation of your thin client / computer.

Configuring a thin client to boot via Etherboot using the 2X ThinClientOS LiveCD

Step 1: Download the 2X ThinClientOS image

Download the 2X ThinClientOS image as a ZIP file, called 2XThinClientOS_<version number>.zip from:

http://www.2x.com/downloads

Note: The Etherboot image is the same image used for PXE booting. Therefore if you have already downloaded the PXE image you can use that same image.

Step 2: Copy the image to a 3rd party TFTP Server (optional)

If you are using a 3rd party TFTP server instead of the one already bundled with 2X ThinClientServer, please note the following:

Upon boot, the thin client must find a TFTP server and download the 2X ThinClientOS image. Therefore you must extract the contents of the "PXE" folder found within the downloaded 2XThinClientOS zip file to the directory from which the TFTP server serves files. The industry default is X:\tftproot. To install the remaining files needed during the boot procedure, ensure you install the new 2X ThinClientOS image by following the section entitled "Installing a new 2X ThinClientOS" later on in this chapter.

Note that 2X ThinClientServer will automatically install it's own TFTP Server to allow for this functionality without additional configuration from the user. This step is only necessary in the case a TFTP Server is already installed on the 2X ThinClientServer machine and providing services to the network, or if you intend to use a TFTP server already commissioned elsewhere on your network.

Step 3: Download the 2X ThinClientOS LiveCD

The 2X ThinClientOS LiveCD provides the option to boot over the network from your CD-ROM using Etherboot. If you wish to use a floppy disk or hard drive to boot via Etherboot, you can proceed directly to Step 6. Download the 2X ThinClientOS image as an ISO file, called 2XThinClientOS_<version number>.iso from:

http://www.2x.com/downloads

Step 4: Burning the ISO image to a CD-ROM

To burn the downloaded image to CD-ROM:

- If using Windows XP and Nero Burning ROM simply go to menu "Recorder", choose option "Burn Image…", and select

the downloaded .ISO file.

- If using Linux & K3B, simply go to Burn CD. Select the ISO image and click ”Start”.
- Use good quality CD-ROM (avoid CD-RW) media which is known to work with your CD-ROM drive.
- Burn the CD as a finalised single session using track-at-once (TAO).
- Enable Buffer-Underrun Protection.
- Ensure that the downloaded ISO file is not in use (for example by anti-virus software).
- Set the burning speed to match the recommended speed specified by the CD-ROM media and gradually lower the speed if problems are encountered reading the CD-ROM.
- Ensure that the system has enough free resources to complete the burning process.
- If problems persist try to boot from the CD-ROM drive used to burn the ISO.

Step 5: Configure the thin client to boot from CD-ROM

After you have burned the CD-ROM, insert the CD-ROM into the CD-ROM drive of the thin client / computer. Now ensure that the thin client will attempt to boot from the CD-ROM and not from another storage device. Go into the computers BIOS and check that the boot sequence starts with the CD-ROM drive.

Installing a new version of 2X ThinClientOS

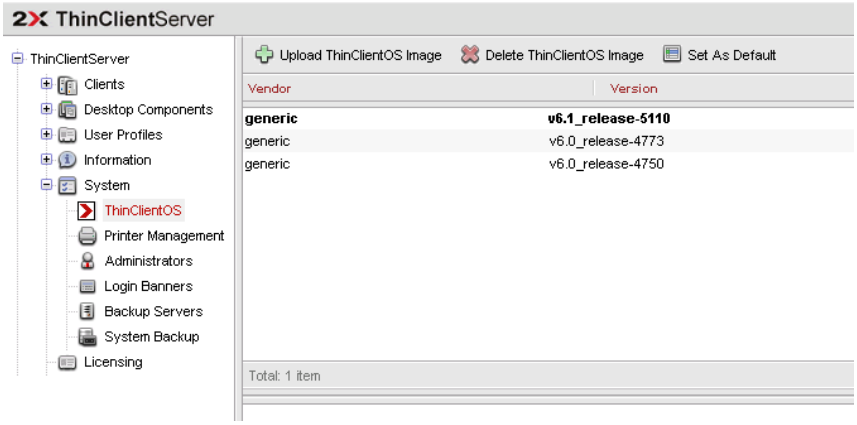
2X releases new updates to the 2X ThinClientOS on a regular basis. These updates will incorporate improvements to hardware detection, updates to terminal server clients, and more.

Thin clients that boot from the hard disk, USB disk, via PXE, or via Etherboot, will automatically retrieve and use the latest 2X ThinClientOS version installed via the Management Console.

To install the latest 2X ThinClientOS:

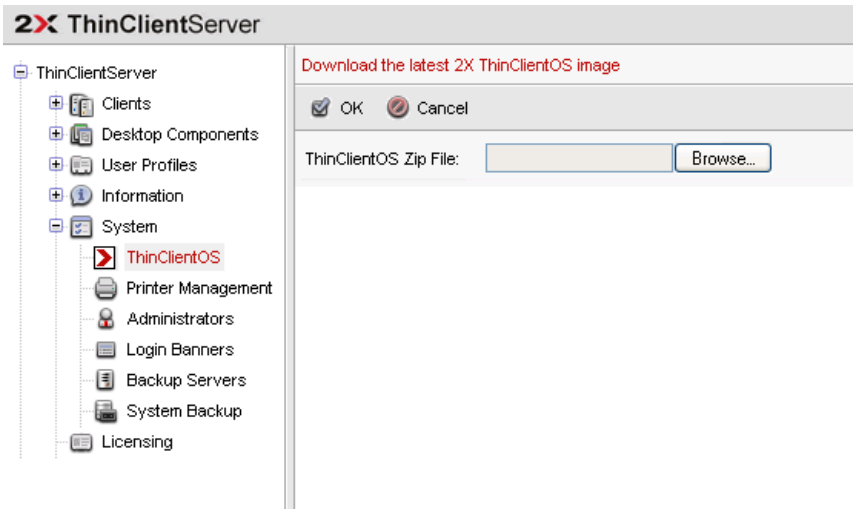
1. Download the latest 2XThinClientOS_<version number>.zip from http://www.2x.com/downloads
2. If your thin clients boot via PXE or Etherboot, extract the contents of the PXE folder in the ZIP file to the TFTP directory on the 3rd party TFTP server. This is not necessary if you are using the TFTP server bundled with 2X ThinClientServer. The next time the thin client boots, it will use the latest 2X ThinClientOS.

3. Install the downloaded 2X ThinClientOS version by going to the “ThinClientOS” node under “System” in the 2X ThinClientServer Management Console sidebar.



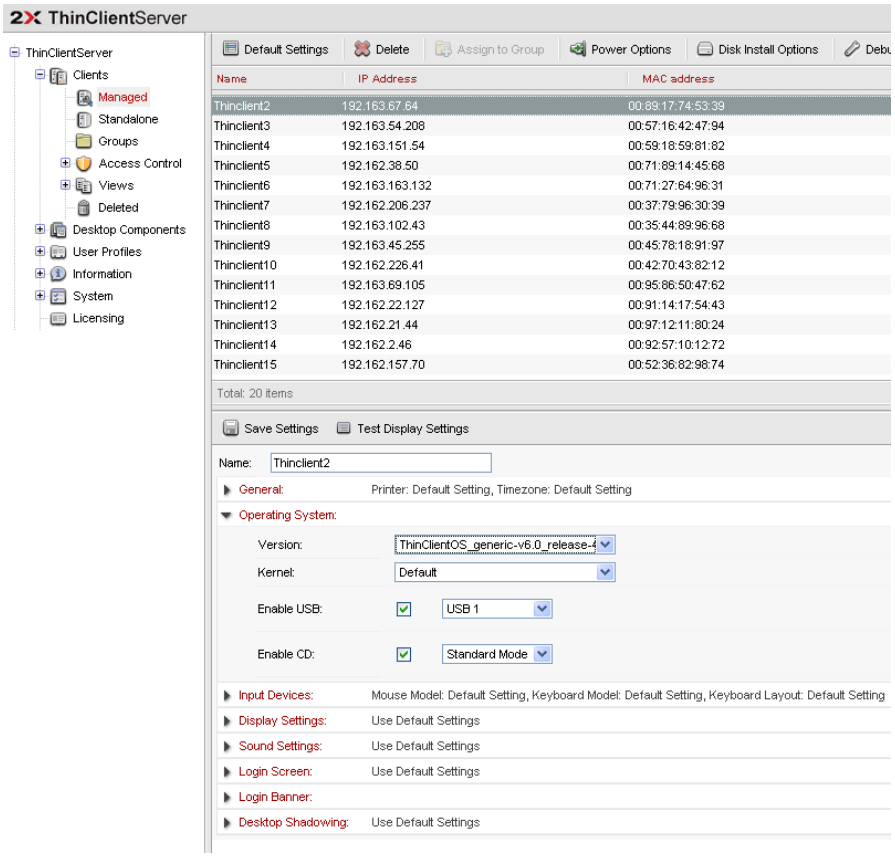
Screenshot 44: Installing the latest 2X ThinClientOS

Click on ”Upload ThinClientOS Image”. Now you will be able to browse for the 2X ThinClientOS file you downloaded using the “Browse…” button.



Screenshot 45: Select new 2X ThinClientOS image

4. Once installed, all thin clients that are configured to use the latest thin client OS image will retrieve the update and install it automatically. Only a reboot is required.



Screenshot 46: Checking that thin clients use the latest 2X ThinClientOS

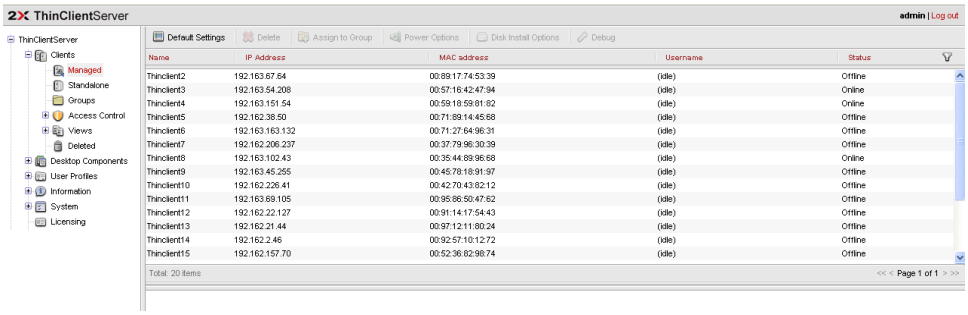
Managing Thin Clients & Sessions

Introduction

The 2X ThinClientServer Management Console allows you to manage thin clients and view past and active sessions.

Managing the thin clients

Some settings can only be managed on a ‘per-thin client’ basis. For example, you can specify a resolution for a particular lower end ThinClient.

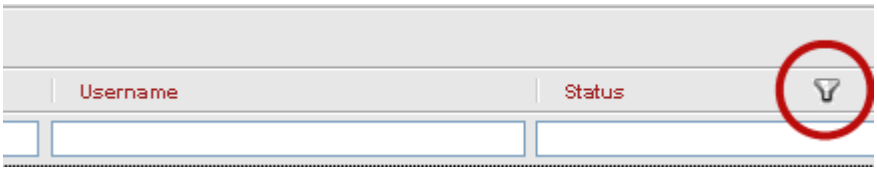


Screenshot 47: List of thin clients available for management

To manage a thin client, click on the ”Managed” node under “Clients”. All thin clients will be listed in the right pane.

If you want a setting to be used as a default by all thin clients then you can click on the “Set Defaults” button and edit the “Default Client”. Most settings are inherited from this template client while others are used as initial default values.

You can use the search facility provided to filter by keywords those clients you would like view. Simply type some text in the search field and those thin clients that do not match the text entered will be filtered out of the list.



Screenshot 48: Search Button

Clicking the search button will then show a new toolbar with the following search fields:

- **Name**
- **IP Address**
- **MAC Address**
- **Username**
- **Status**

Setting thin client defaults

When a machine boots with the 2X ThinClientOS for the first time, it uses the default settings in the default client. This can be accessed by clicking on the “Default Settings” button inside the “Managed” node under “Clients”.

The layout of the settings is exactly like that of a real ThinClient. The difference is that those settings will affect all clients which have no explicit custom settings.

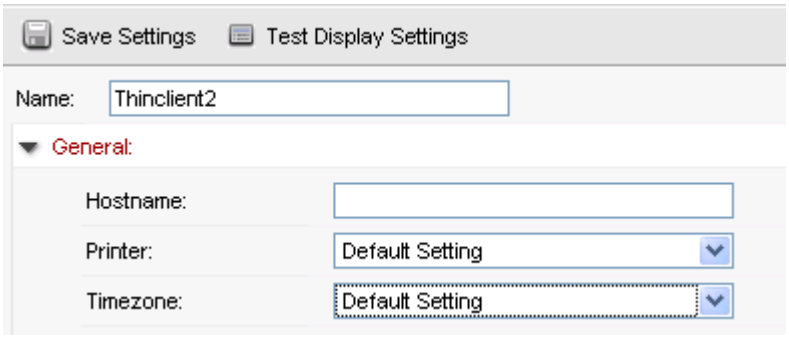
The purpose of this option is to quickly set common settings which exist in your current scenario due to a particular manufacturer or country. First boot a test thin client and make sure that you have identified all settings that are required to boot it correctly by editing the thin client itself. Once you think you have a good template, copy the common settings to the “Default Client” so that they will be automatically inherited by all your other clients.

Editing thin client settings

To edit any thin client settings, simply click on the thin client name. This will load the details in the bottom frame of the page.

You can alter any of the settings. To save, click the “Save Settings” button.

General settings



Screenshot 49: Edit thin client general settings

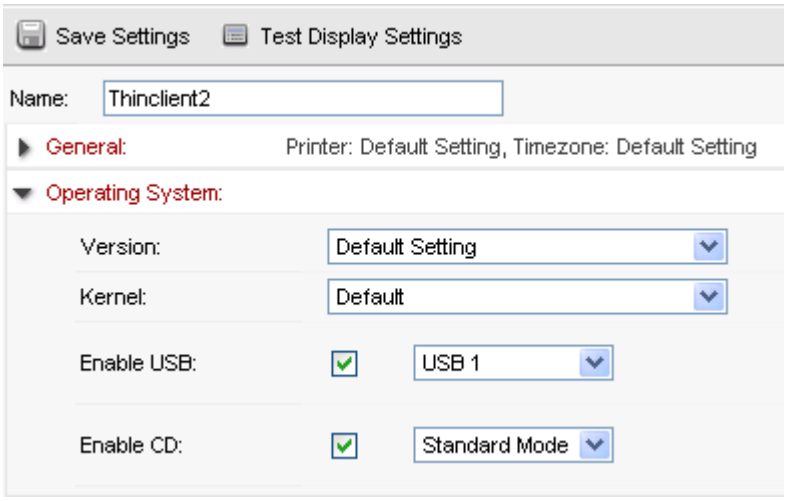
Name: Allows you to enter a recognizable name for the thin client.

Hostname: Allows you to set the hostname the machine will respond to on the network.

Printer: Allows you to enable or disable a printer.

Timezone: Allows you to configure the thin client’s time zone. The actual time is sourced from the Thin Client machine’s BIOS. To automatically keep the time up to date check the Preparing the DHCP server section at the end of the manual.

Operating System Options



Screenshot 50: List of Boot Options available for customization

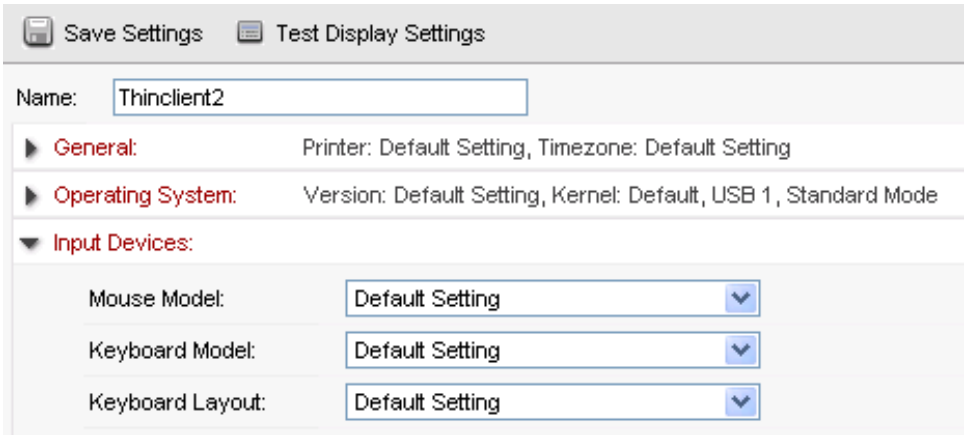
Version: Allows you to specify which version of the 2X ThinClientOS to use.

Kernel: Allows you to specify which set of hardware support drivers the 2X ThinClientOS will use. Version 2.6 provides new and updated drivers for the latest hardware and has better support for USB attached devices. Version 2.4 is more suited for clients with older/slower hardware which have had limited success in booting with the newer kernel version.

Enable USB: Choose the level of USB support available from your hardware.

Enable CD: This should be left in “Standard Mode” unless there are any problems. If any problems occur when booting from the CD switch it to “Safe Mode”.

Input Devices



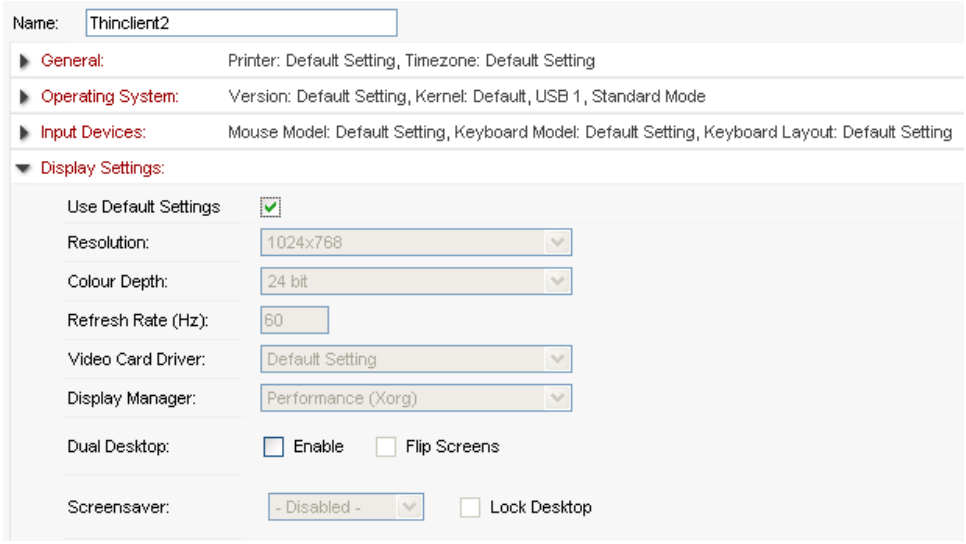
Screenshot 51: List of Input Devices settings available for customization

Mouse Model: Specify the mouse attached to the thin client.

Keyboard model: Specify the keyboard attached to the thin client.

Keyboard layout: Select the appropriate keyboard layout.

Display Settings



Screenshot 52: Display Settings customization options

Use Default Settings: This will use the default settings that can be set for all the thin clients. By default this is enabled.

Resolution: Specify the resolution you would like 2X ThinClientOS to use.

Colour Depth: Specify the number of colours used by 2X ThinClientOS. This is subject to the memory available to the video

card.

Refresh Rate (Hz): The frequency in Hertz by which the monitor will refresh every second. Please check the frequencies that the monitor supports.

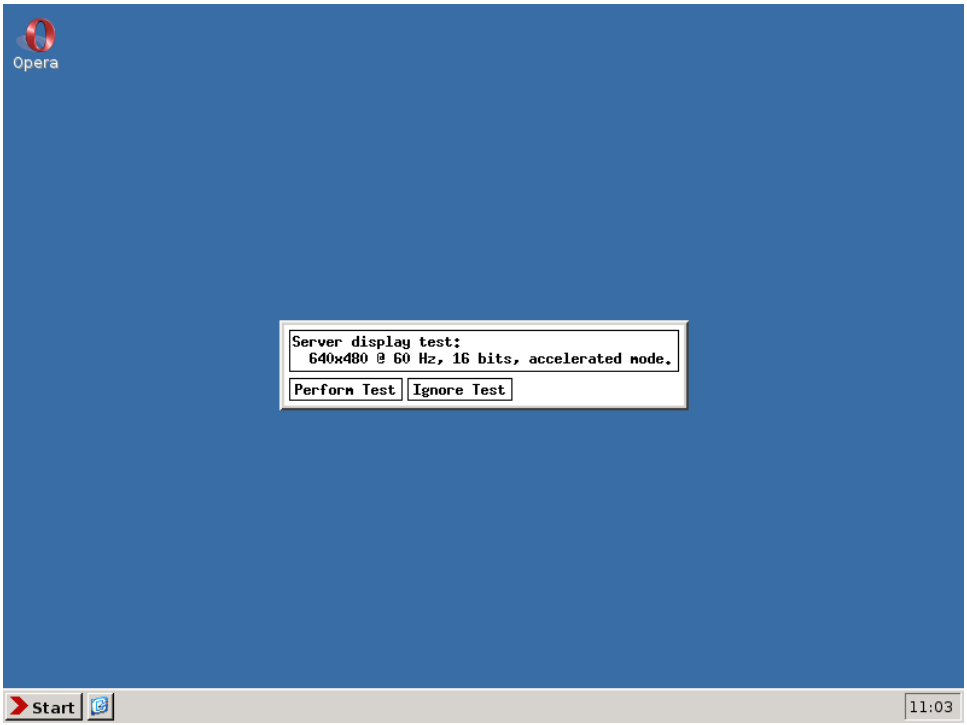
Video Card Driver: If the thin client has auto-detectable video hardware, the appropriate driver is displayed. If necessary, you may set the video driver manually for the thin client.

Display Manager: The default setting for new thin clients is “Performance (Xorg)”. If the thin client requires support for older hardware you can choose “Compatibility (XFree86)”.

Dual Desktop: If 2X ThinClientOS detects hardware capable of supporting dual monitors, you will be able to enable support for this configuration. You may also choose the “Flip Screens” option if you would like to switch the monitors between primary and secondary.

Screensaver: Choose if you want to start the screen saver on the thin client after a certain amount of time. You can also lock the desktop so that the user has to enter his/her credentials upon return.

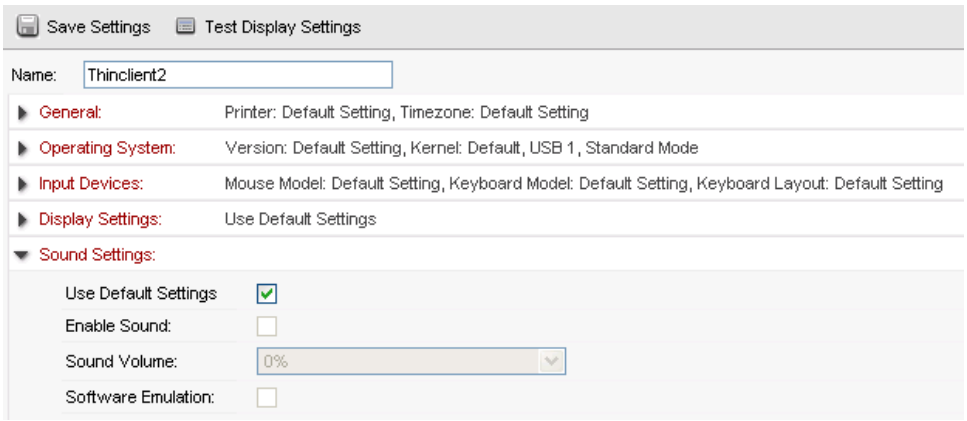
After configuring the “Display Settings” click on “Test Display Settings” to make sure that the settings are supported by the thin client and the display.



Screenshot 53: Start the display test on the thin client

Click on “Perform Test” to start the display test. You will be notified if the test was successful or not and the settings will be applied once the thin client is rebooted.

Sound Settings



Screenshot 54: Sound Settings

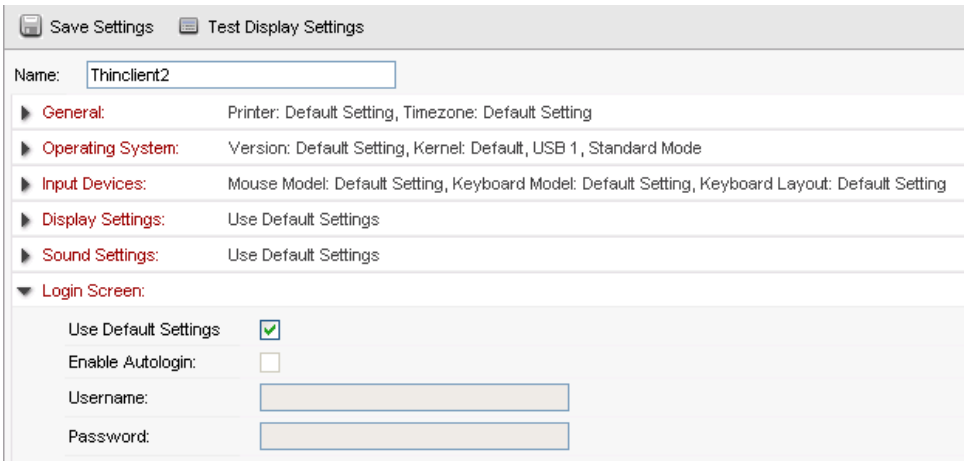
Use Default Settings: This will use the default settings that can be set for all the thin clients. By default this is enabled.

Enable Sound: If enabled, this will allow the thin client to play sound.

Sound Volume: This sets the sound volume for the thin client.

Software Emulation: This should not be checked unless you hear any distortion during sound playback. If you do hear any distortion try using this option which introduces an intermediate sound engine that can help deliver a clear sound.

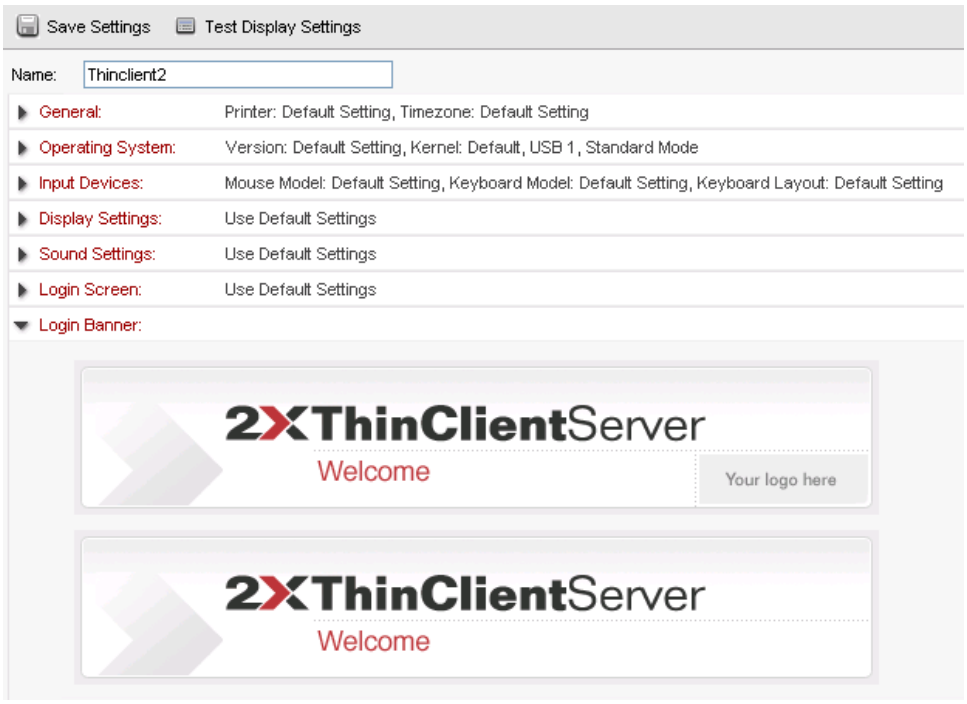
Login Screen



Screenshot 55: Client Login Settings

You can enable auto-login for Full Desktop connections from this thin client and specify the relevant credentials in this section.

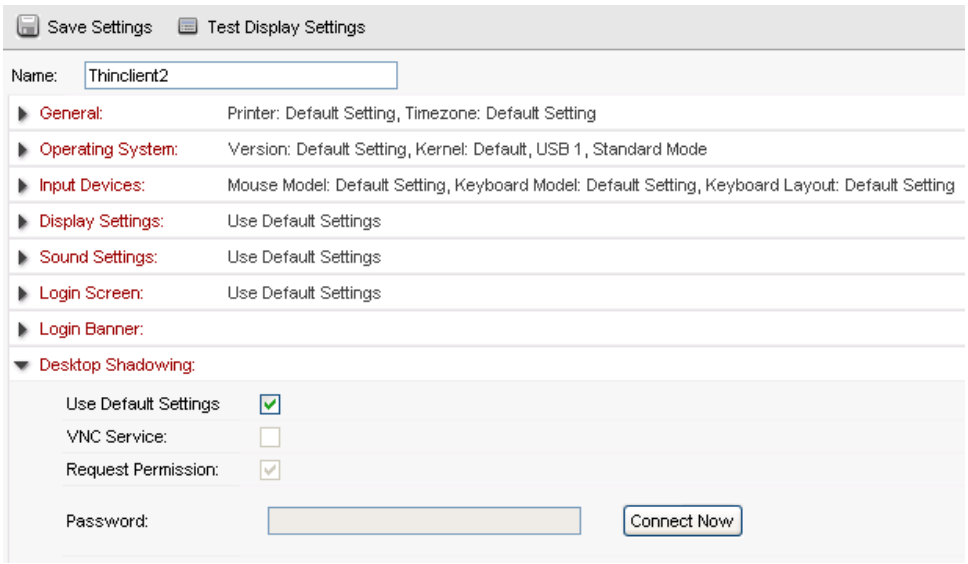
Login Banner



Screenshot 56: Choose default banner

Use default banner: Choose the banner that you want your thin clients to show during login.

Desktop Shadowing



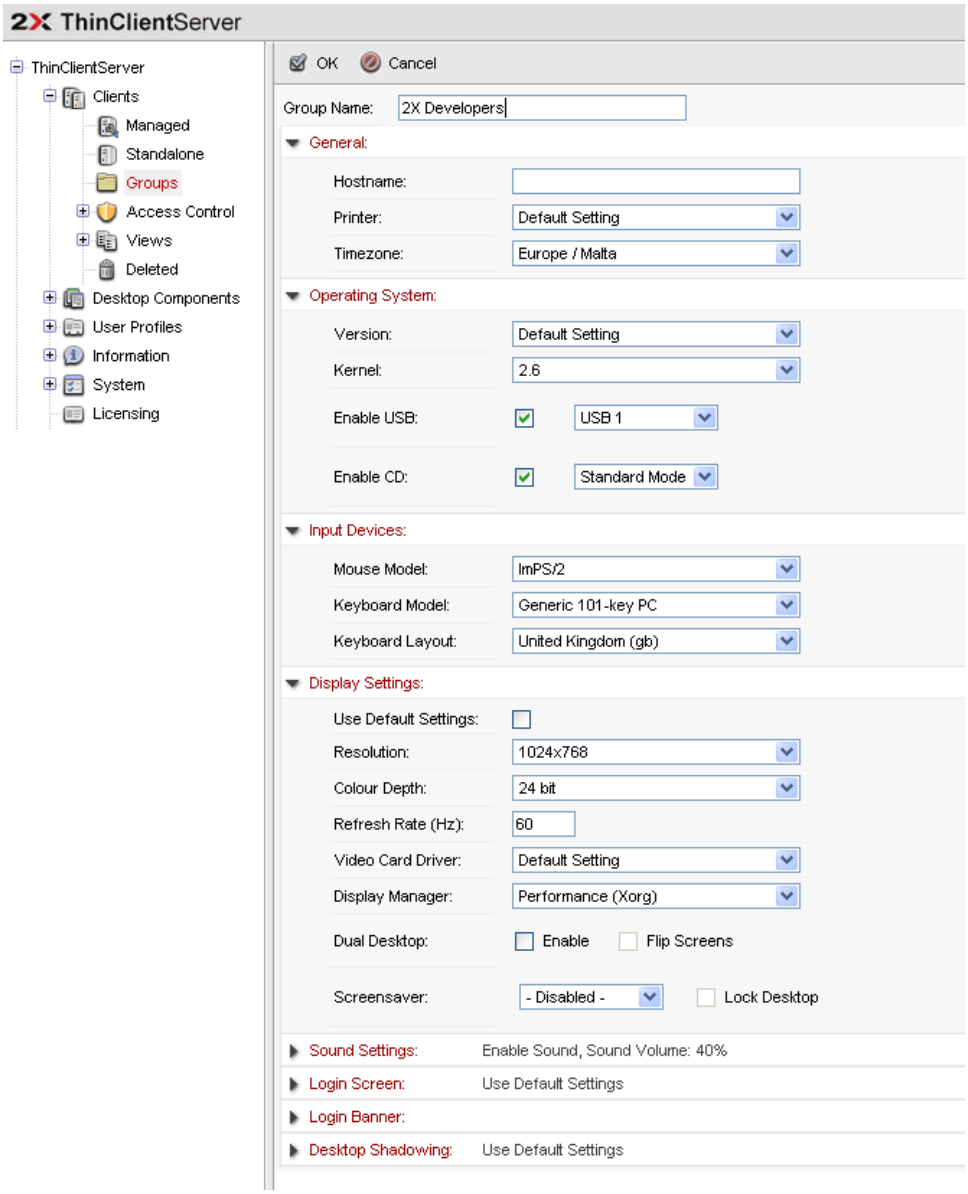
Screenshot 57: Setting shadowing parameters

You can enable session shadowing for the thin client and specify the relevant password in this section. Click on the “Connect Now” button to start a shadowing session to this thin client.

Groups

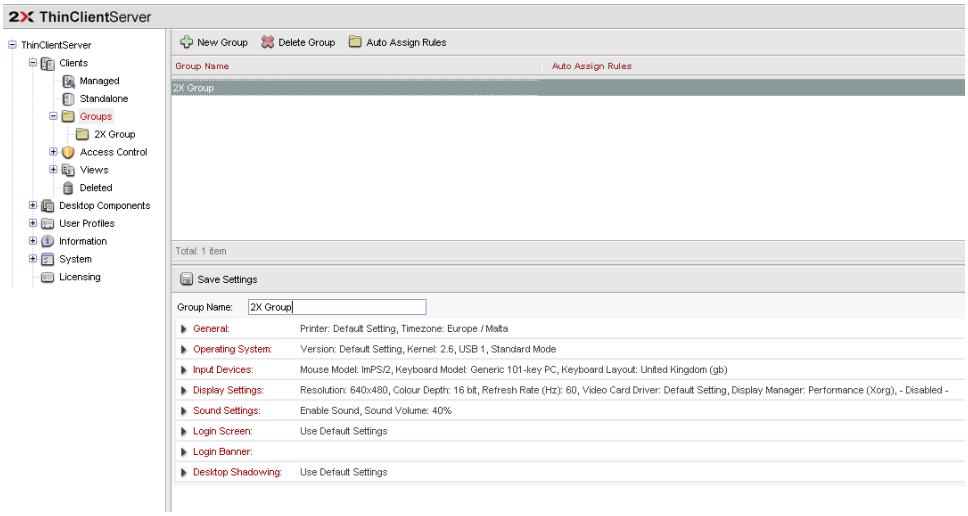
A group can be created which defines a certain set of settings that affect all the thin clients which are members of the group. The settings are the same as those described in the previous sections but do not apply to a single thin client. They apply to a number of thin clients that are members of the “Group”

Create a Group: Click on the “Groups” node under “Clients” and click on “New Group”.



Screenshot 58: Adding a New Group

Edit Group: Any group can be edited by selecting the group you want to edit and changing the settings from the frame that loads below.



Screenshot 59: Edit a group

Delete Group: Any group can be deleted by clicking on “Delete Group”. Note that when a group is deleted the clients will adopt the standard default setting and they will NOT be deleted.

Auto Assign Rules: Allows you to add the MAC and IP address of a client so that when it is booted for the first time the thin client is immediately added to the specified group.

Add a client to a group: To add a client to a group simply drag and drop the client(s) from the “Managed” node onto the chosen group. You can also use the “Add to Group” button on the toolbar and select the group you would like the client(s) to join.

Deleting a thin client

You can use this facility to eliminate from the list of thin clients available for management those thin clients that are obsolete because they are no longer connected to the network. A thin client can be recovered at any time by clicking on the “Recover Client” button in the “Deleted Node”.

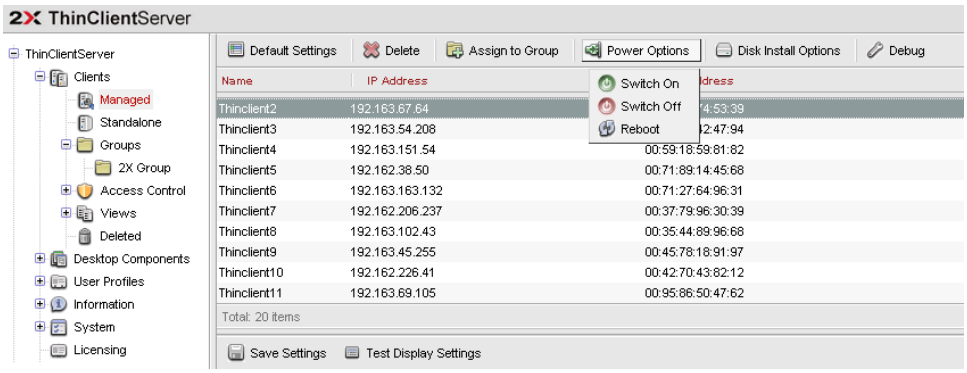
Setting default settings for all thin clients

You can use this facility to provide system-wide defaults for all thin clients connected to this 2X ThinClientServer.

All parameters described in “Managing the thin clients” (except for

those parameters that are individual thin-client related) can be applied as system-wide defaults in this section. To view the default settings click on “Default Settings”. When you are done editing the settings and would like to save click on “Save Settings”

Power Options



Screenshot 60: Power Options

Switch on a Thin Client

You can use this facility to switch on a thin client by sending a Wake-On-Lan signal to this thin client over the network.

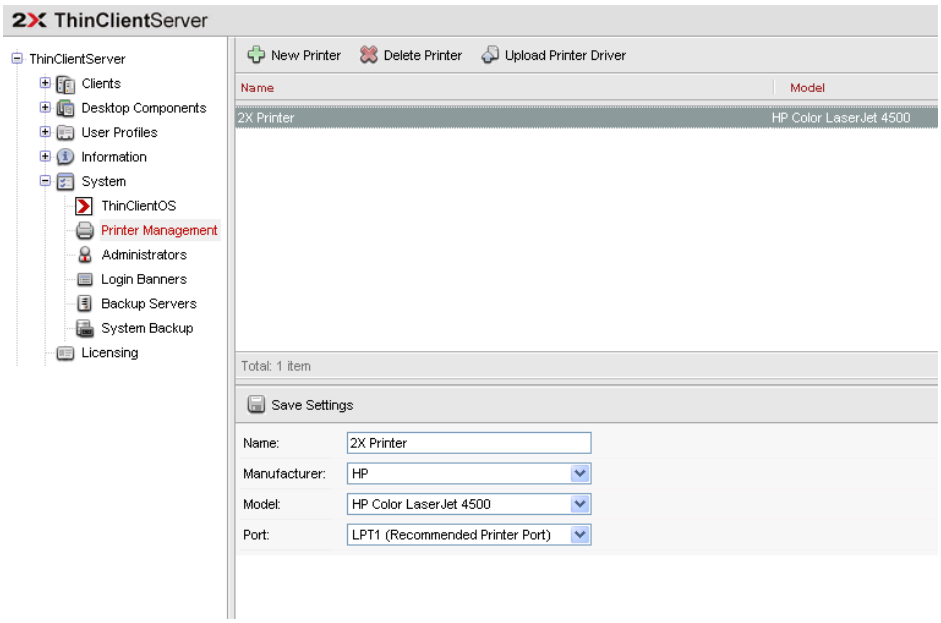
Shutdown a thin client

You can use this facility to force a thin client to shut down.

Rebooting a thin client

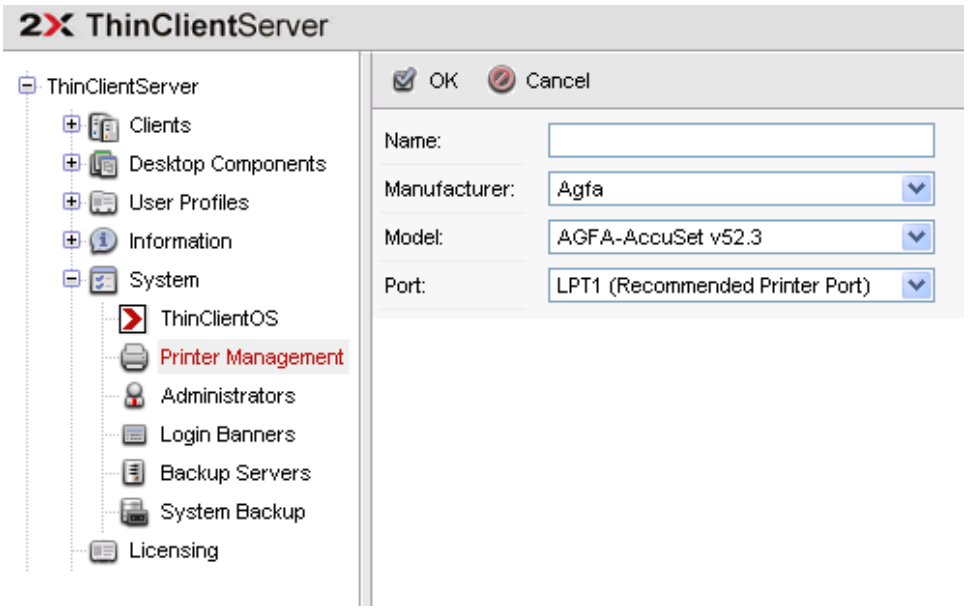
You can use this facility to force a thin client to reboot to enable debugging features, or to enable a new version of 2X ThinClientOS for the thin client.

Managing Printers



Screenshot 61: A list of all the printers available

2X ThinClientServer supports printing to printers connected to a thin client. In order for this to work, an administrator must install the drivers for the printer connected to the thin client in the “System” > “Printer Management” node. To do this:



Screenshot 62: Install Printer dialog

1. Click on the “Printers Management” node

2. Specify the name of the printer, the manufacturer, the model and the port to which it is connected.

3. If your printer is not listed:

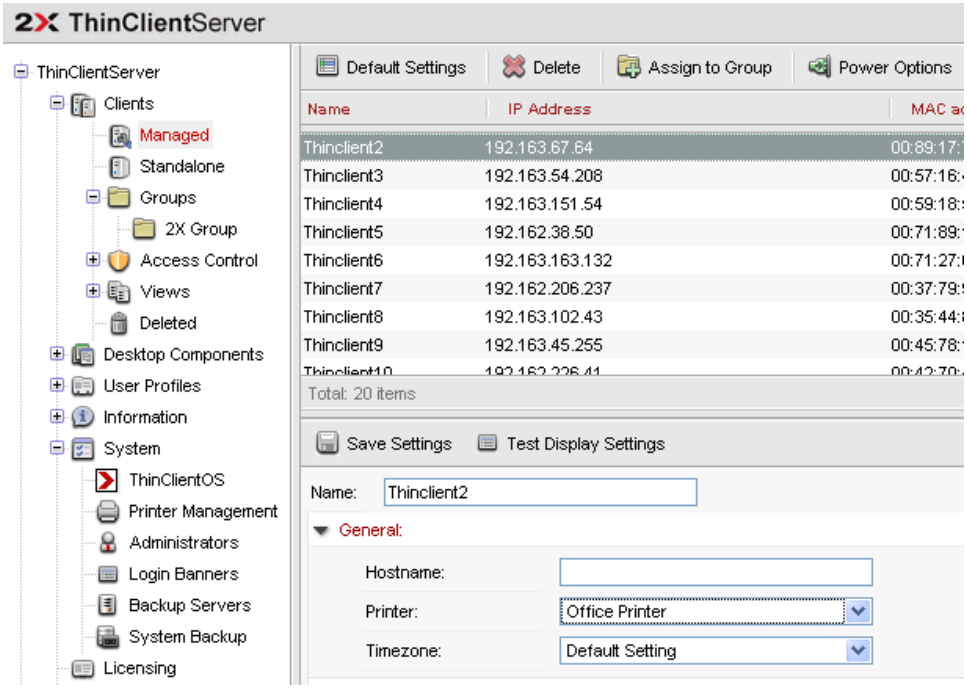
    1. Obtain your printer driver .INF file.

    2. Return to the main Printer Management screen.

    3. Click on “Upload Printer Driver”

    4. Click on the “Browse” button and select the appropriate .INF file containing the setup information for your printer. The “Manufacturer” field and the “Model” field will now list the information contained in the .INF file selected. Select the appropriate manufacturer and printer and click “OK”.

    5. You will be returned to the “Printer Management” node. The newly installed printer can now be added using the steps indicated.



Screenshot 63: Assigning a printer to a thin client

4. Now you can select the printer from the “Managed” thin client settings section.

5. Click on the thin client to which the printer must be connected.

6. Select the printer you just created in the “Printer” drop down list in the “General” section.

7. Click “OK” to confirm.

8. At the next thin client log-on, the printer will appear under 'My Printers'.

Managing Banners

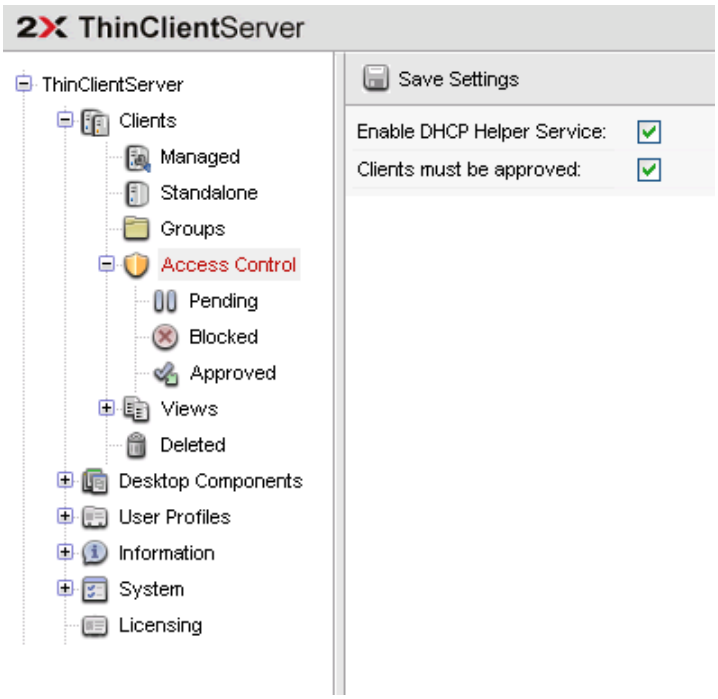
2X ThinClientServer allows the system administrator to specify the default banner for all thin clients which have not been allocated a custom banner.

Managing the 2X DHCP Helper

2X ThinClientServer allows the system administrator to specify which thin clients are allowed to connect using the configured connections, by applying selection rules that work by thin client MAC address.

Enable DHCP Helper Service: Will foward new thin clients on the network to the 2X ThinClientServer to provide the relevant information for the thin clients to boot up.

Clients must be approved: The administrator must first approve any new clients for them to be able to connect to 2X ThinClientServer and boot.



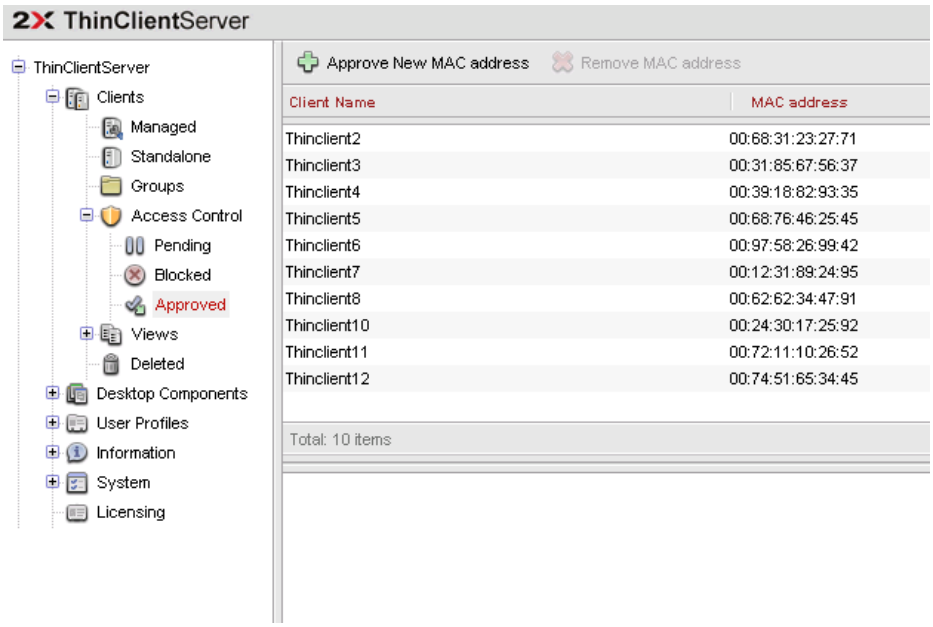
Screenshot 64: Enabling DHCP Helper

Pending: Will show all the MAC addresses that are waiting for the

administrators to decide if they will be approved or denied.

Blocked: Will show those MAC addresses that are blocked. Any known MAC address can be blocked by clicking on the “Add MAC Address” button. To unblock a MAC address select the one(s) you would like to unblock and click “Unblock MAC Address”

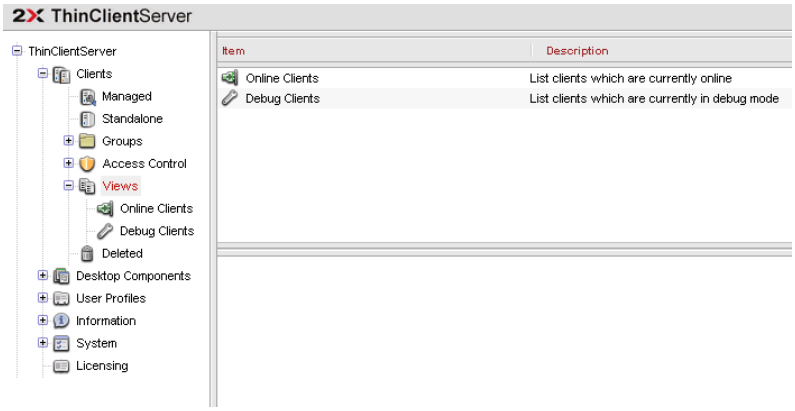
Approved: Will show those MAC addresses that are approved. MAC address can be added by clicking on the “Approve New MAC Address” button. To block a MAC address select the one(s) you would like to block and click “Remove MAC Address”



Screenshot 65: A list of Approved MAC Addresses

Views

With Views, you can filter the thin clients according to a certain property. You can select to view clients that are currently online or those that are in debug mode.



Screenshot 66: Views

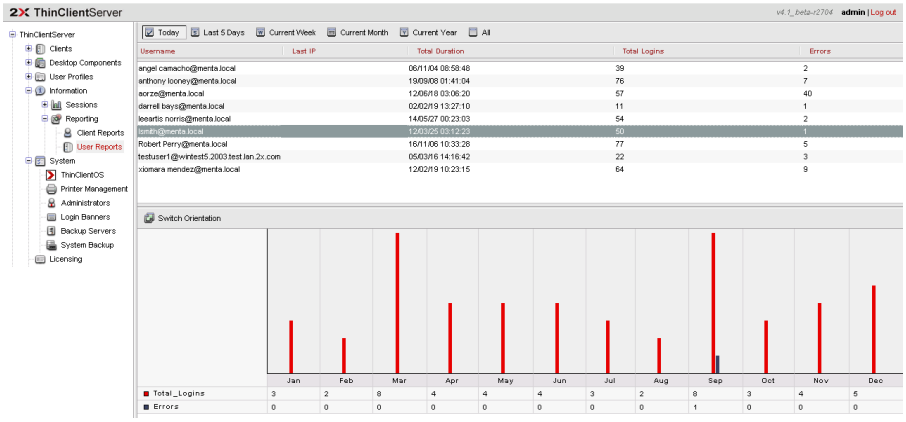
Setting default settings for all thin clients

You can use this facility to provide system-wide defaults for all thin clients connected to this 2X ThinClientServer. All you need to do is click on the “Clients” node and then click on the “Default Settings” button.

All parameters described in “Editing thin client settings” (except for those parameters that are individual thin-client related) can be applied as system-wide defaults in this section.

Reporting

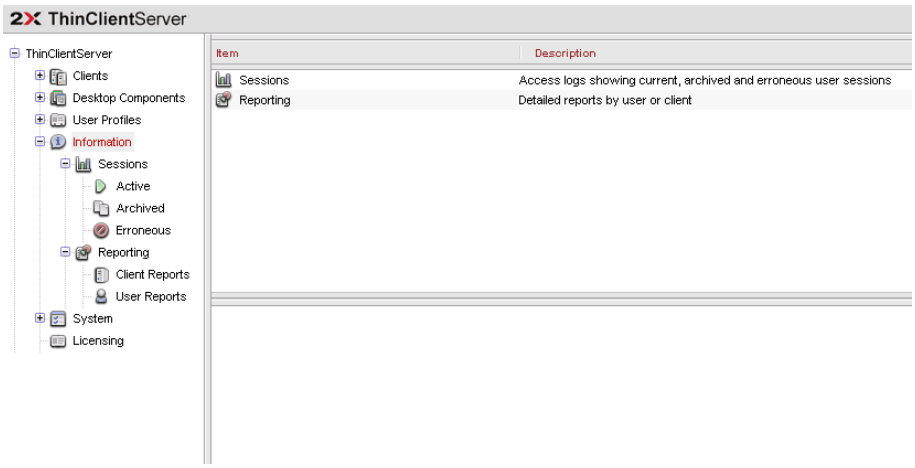
You can use this facility to view graphical usage reports by username or by thin client specifying the time ranges you would like to examine.



Screenshot 67: User Reports

Sessions

The 'Sessions' node shows you the users that are or have connected to a terminal server. There are 3 sub-nodes for currently active sessions, past sessions and erroneous sessions.

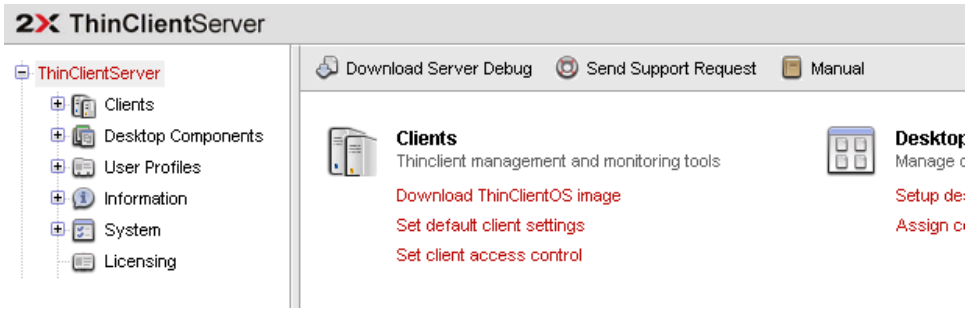


Screenshot 68: Accessing Sessions and Reporting

Active: The session log shows the username, connection applied, thin client name & IP address, terminal server connected to, and start and end of session (if terminated).
Archived: The session log shows the details of previously-terminated sessions.
Erroneous: The session log shows the details of previously-terminated sessions that generated an error.

Support

The highest node which is the “ThinClientServer” node shows a link to documentation and support relative to the day-to-day usage of 2X ThinClientServer.



Screenshot 69: Support Link

Download Server Debug: This button will allow the user to manipulate options for debugging and logging of session events for 2X ThinClientServer and 2X ThinClientOS for subsequent submission to the 2X Support Centre for effective resolution of support issues.

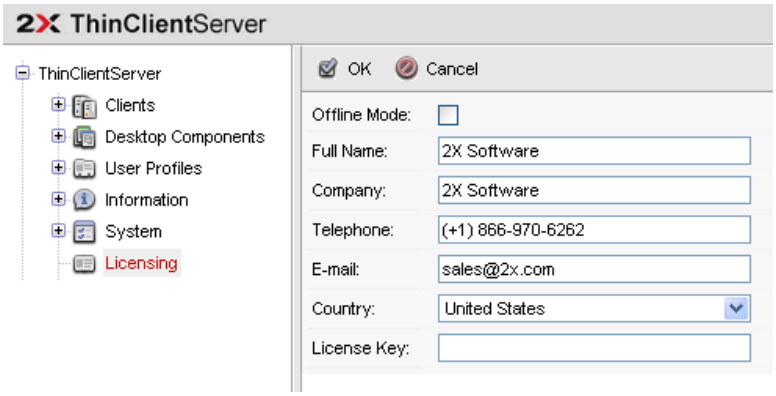
Send the resulting zip file as an attachment to the support ticket via the link provided in the Management Console.

Support Portal: This node will link you directly to the 2X Support Centre Portal at http://www.2x.com/support.

Manual: The default installation of 2X ThinClientServer will include the user manual (this document) in PDF version for reference. Please note that you will require a PDF reader to view the manual. Adobe Acrobat Reader is a free application that will allow viewing of PDF documents, and can be obtained from http://www.adobe.com.

Licensing

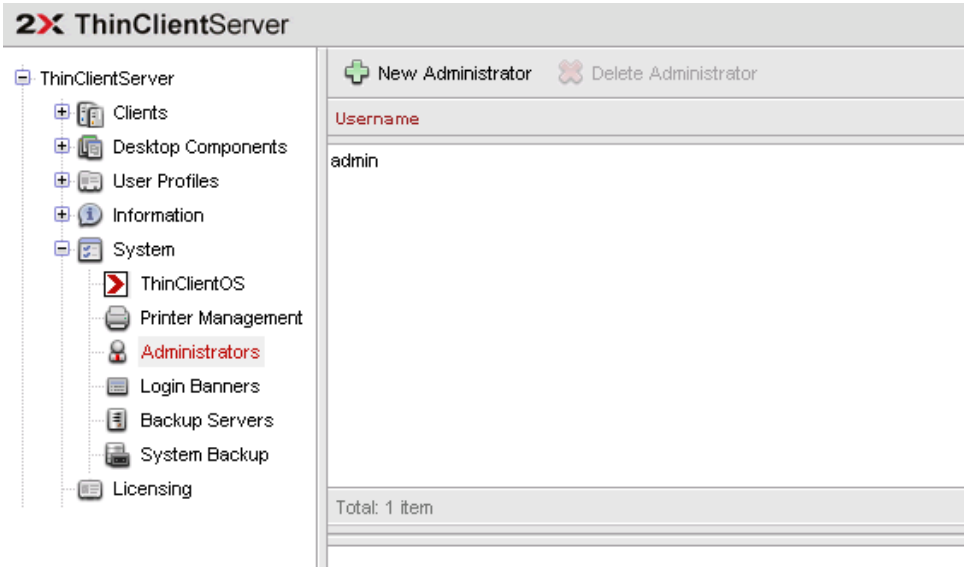
This node will allow you to activate 2X ThinClientServer Enterprise Edition. You should enter the license key that was sent to you via email. The “Offline Mode” allows you to activate the product without an internet connection. The application will send an attachment which you will then need to send to support for activation.



Screenshot 70: Licensing

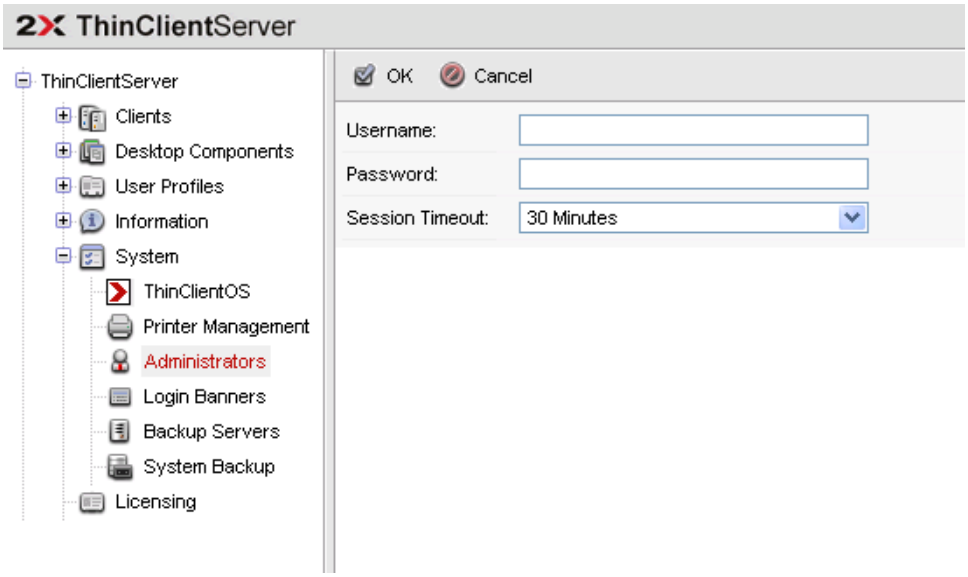
Administrators

This node will allow the user to manage credentials for access to the Management Console and the parameters assigned to each administrator.



Screenshot 71: Administrators Frame

New Administrator: Click the 'New Administrator' button to add an Administrator to the list, specifying the username, password and session timeout duration. Click 'OK' to save the new administrator.

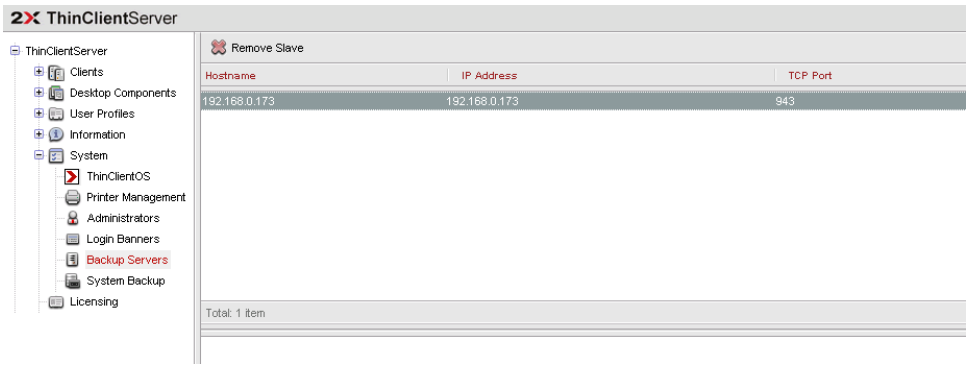


Screenshot 72: New Administrator Form

Delete Administrators: Click the 'Delete Administrator' button to delete the selected administrators.
Edit Administrators: Click an administrator's username to display the "Edit Administrator" form to adjust the parameters assigned to the selected administrator.

Backup Servers

2X ThinClientServer can be used to set up a slave server which is used for backup and redundancy purposes in the event that the master server is down. This will allow your thin clients to operate with a connection to the backup server until the master server is restored. Once the master server is restored any changes that occurred (session logs, etc) will be updated. Note that the management console is only available on the master server so until the master server is restored, the settings cannot be changed. When installing 2X ThinClientServer on the slave server, be sure to select "Join Farm" and enter the details of the master server. In "Server" > "Backup Server" of the master server you will see a list with all the slave servers that are connected.

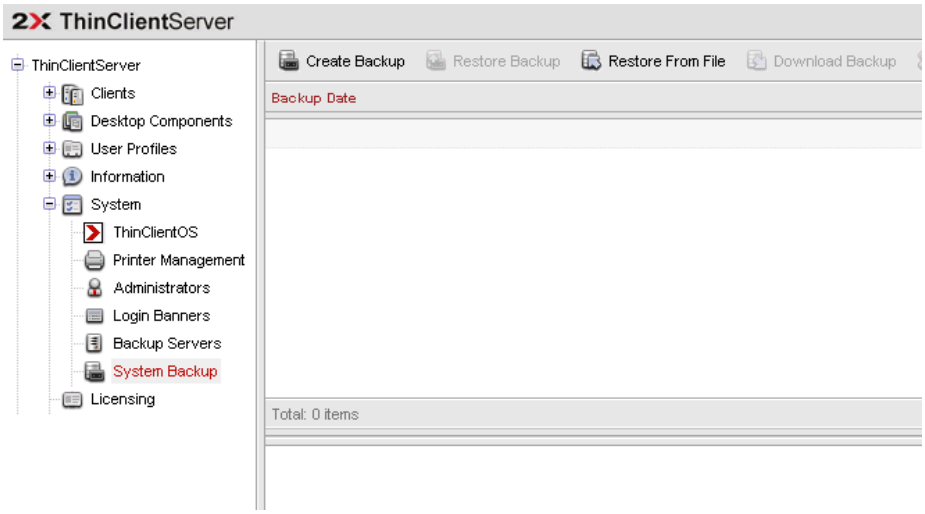


Screenshot 73: Backup Servers

"Remove Slave" will remove the selected backup server from the farm. The DHCP Helper on the backup server will also be disabled. To reconnect the backup server to the farm, you need to reinstall 2X ThinClientServer on the backup server.

System Backup

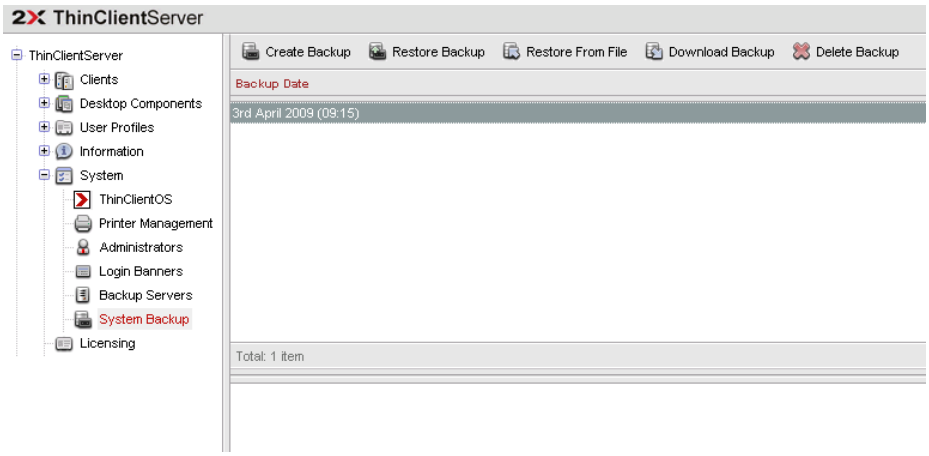
This node will allow the user to create backup files for disaster recovery purposes.



Screenshot 74: System Backup dialog

Create Backup: Click this icon to start the backup procedure.

Screenshot 75: Backup Progress show in the bottom right hand corner



Screenshot 76: List of stored backups

Restore Backup: Select the backup set for restore and click the "Restore Backup" button. Upon the completion, the Management Console will resume from the login screen.

Download Backup: Select the backup set for download and click the Download icon. The Management Console will now prompt for a location to save the file. This feature allows the creation of off-site backups. This file may later be used to restore from off-site backup by clicking the "Restore From File" button, browsing for the file to restore, and clicking the "OK" button.

Restore From File: Upload a backup file which was previously downloaded from the server to be used to restore the system to an earlier time.

Delete Backup: Select the backup set for deletion and click the Delete icon.

Thin client user manual

Introduction

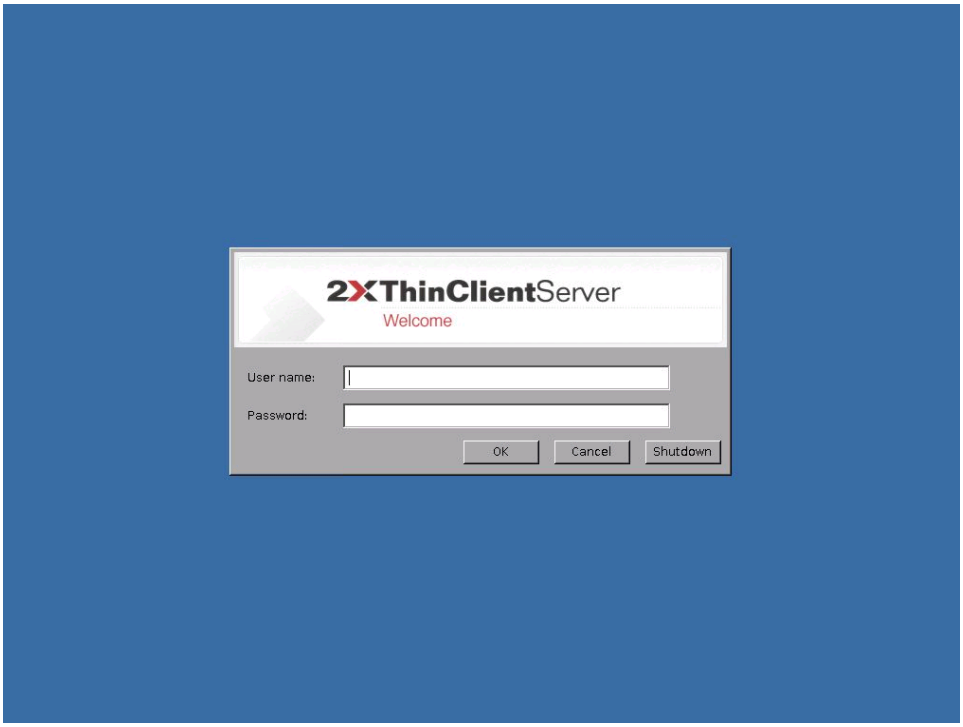
Connecting and working on a terminal server is transparent compared to working on a normal PC. However there a few small differences, which are detailed in this chapter. It makes sense to copy and paste this chapter into an email and send to users who have been switched to thin client desktops.

Logging on to your desktop

ThinClientOS 6.0 - www.2x.com
Starting 2X ThinClientOS... Please Wait.
Copyright 2005-2008 2X Software Ltd. All Rights Reserved.

Screenshot 77: 2X ThinClientOS booting up

When you switch on your thin client/computer, 2X ThinClientOS will present you a logon screen. Enter your login name, hit tab and enter your password. Now hit enter or click OK. A connection will now be established with the terminal server and your usual desktop will be loaded!

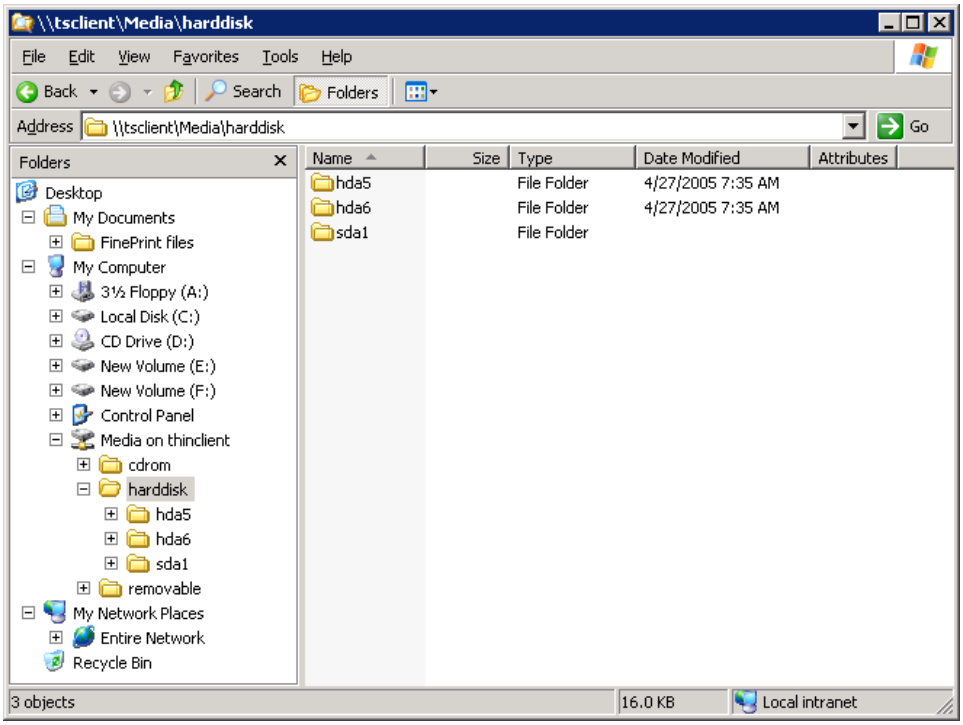


Screenshot 78: Logging in

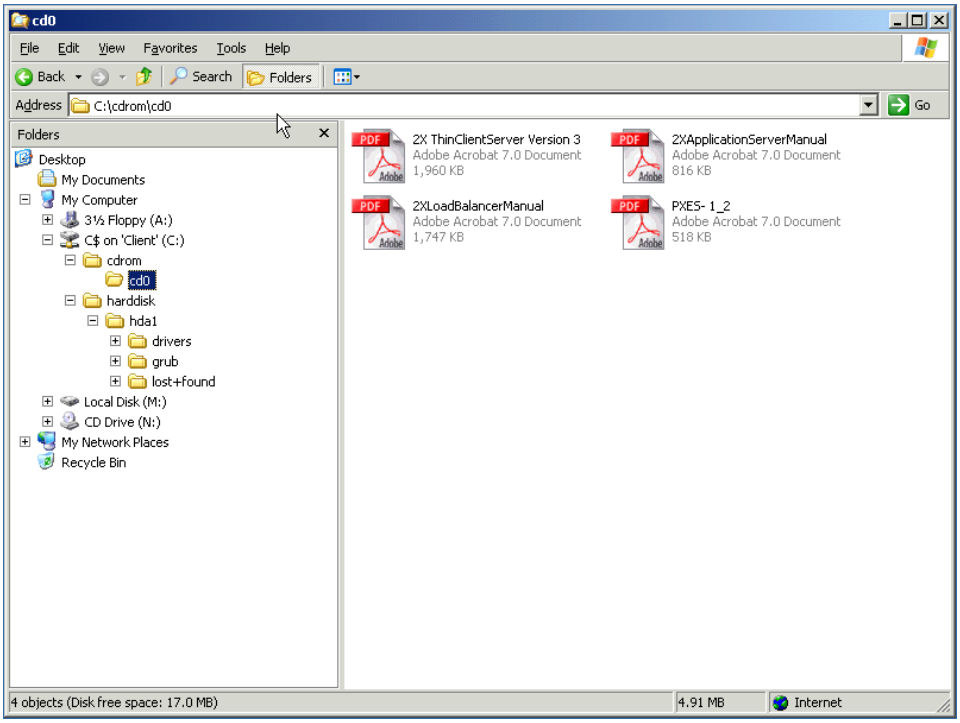
Logging off the Terminal Server

If you want to shut down your session with the terminal server, simply log off. You will be returned to the 2X ThinClientOS screen. To power off the thin client/computer, select “Shut down”.

Accessing local shares & storage devices



Screenshot 79: Accessing media on the thin client

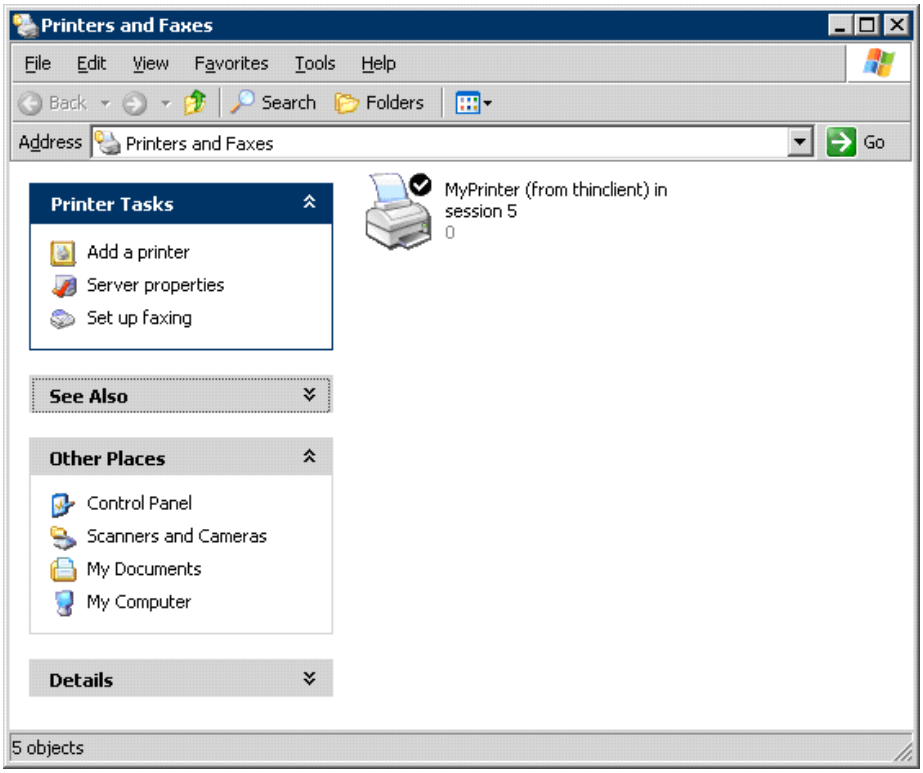


Screenshot 80: Accessing media on the thin client in a Citrix environment

If the thin client on which a user is working has local storage – for example a hard disk, CD-ROM drive or even a USB stick, then the user can access this media via a link ”Media on thin client”

(provided the administrator has granted access). In Windows, this appears as an icon with hard disk and a network connection. The screenshot shows how the local storage will appear. Users can use this storage as they would normally do on their computers.

Printing to a local printer



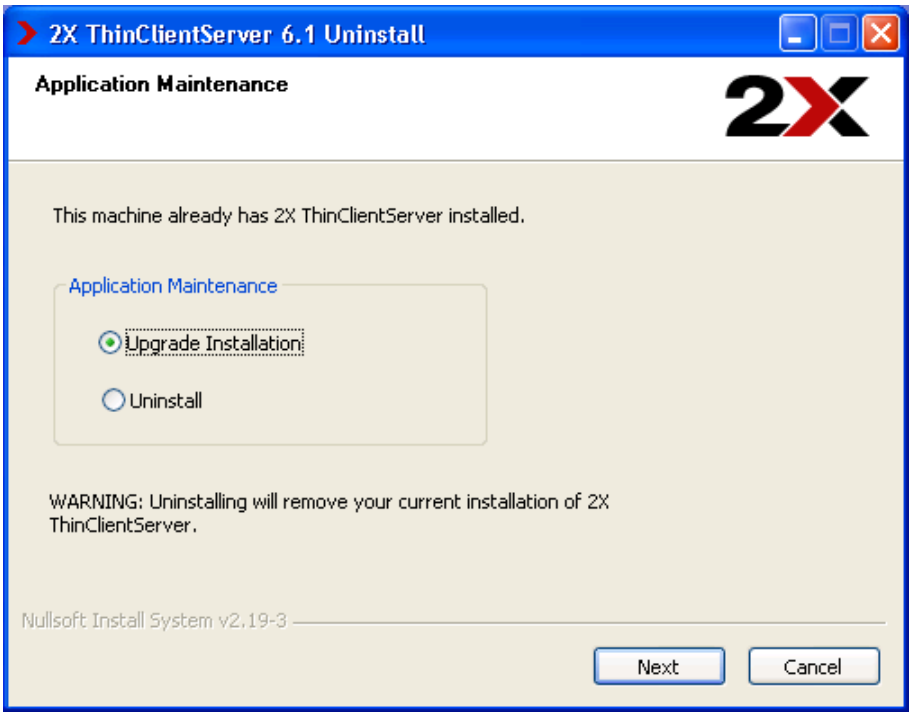
Screenshot 81: Printing to a printer connected to the thin client

If you have a printer connected to the thin client, and if this printer has been installed and configured via the 2X Management Console, then the printer will show up in “Printers and Faxes” and you can print using this local printer.

Upgrading or Repairing a 2X ThinClientServer Installation

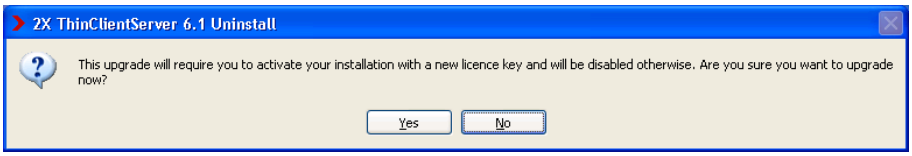
Upgrading 2X ThinClientServer

1. Run setup by double-clicking on the file 2XThinClient-6_x-setup.exe.



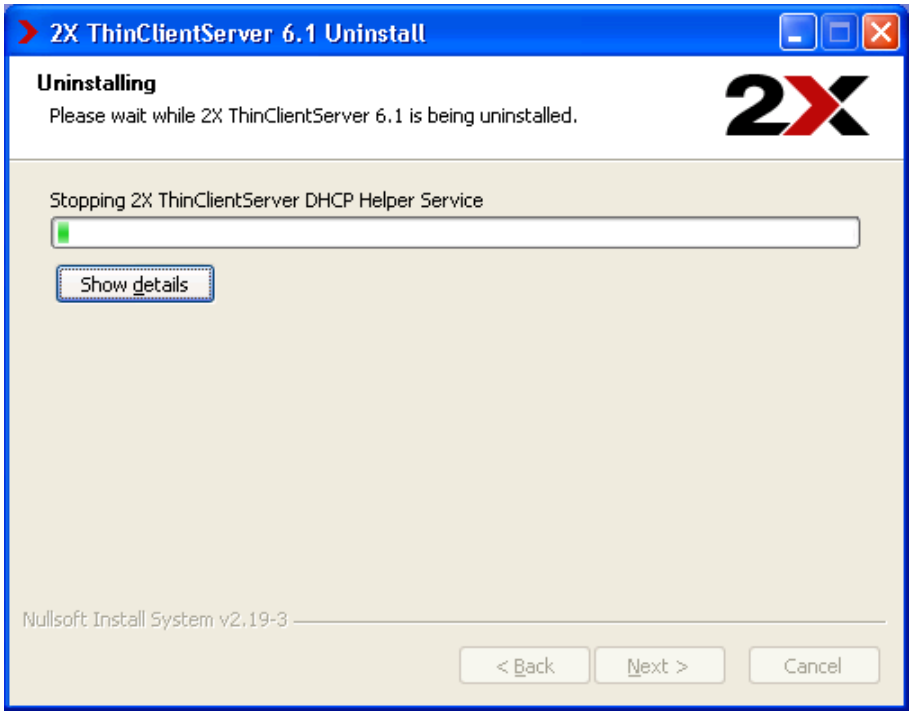
Screenshot 82: Upgrading 2X ThinClientServer

2. You will be informed with a window that the upgrade will require a new licence key. If you want to proceed click “Yes”


2X ThinClientServer 6.1 Uninstall
This upgrade will require you to activate your installation with a new licence key and will be disabled otherwise. Are you sure you want to upgrade now?
Yes
No

Screenshot 83: Upgrade prompt

3. Click “Next” to proceed with the upgrade. The Install Wizard will proceed to uninstall the current version of the program, retaining any settings and configuration files. Click on “Finish” in the next dialog to proceed with installing the new version.

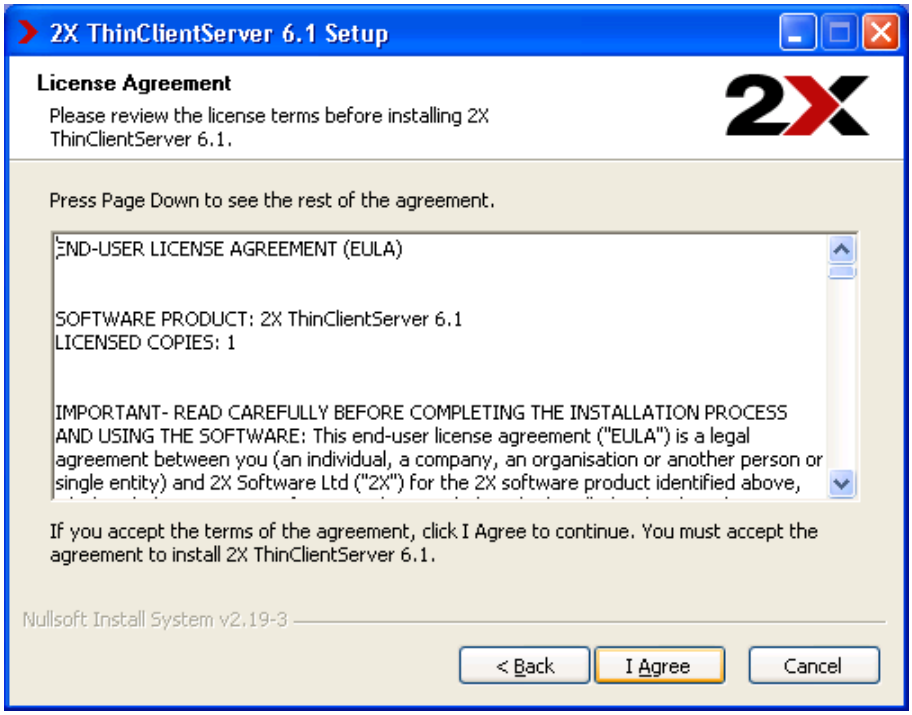


Screenshot 84: Uninstall

2X ThinClientServer 6.1 Uninstall
Completing the 2X ThinClientServer 6.1 Uninstall Wizard
2X ThinClientServer 6.1 has been uninstalled from your computer.
Click Finish to close this wizard.
go thin, go linux!
< Back
Finish
Cancel

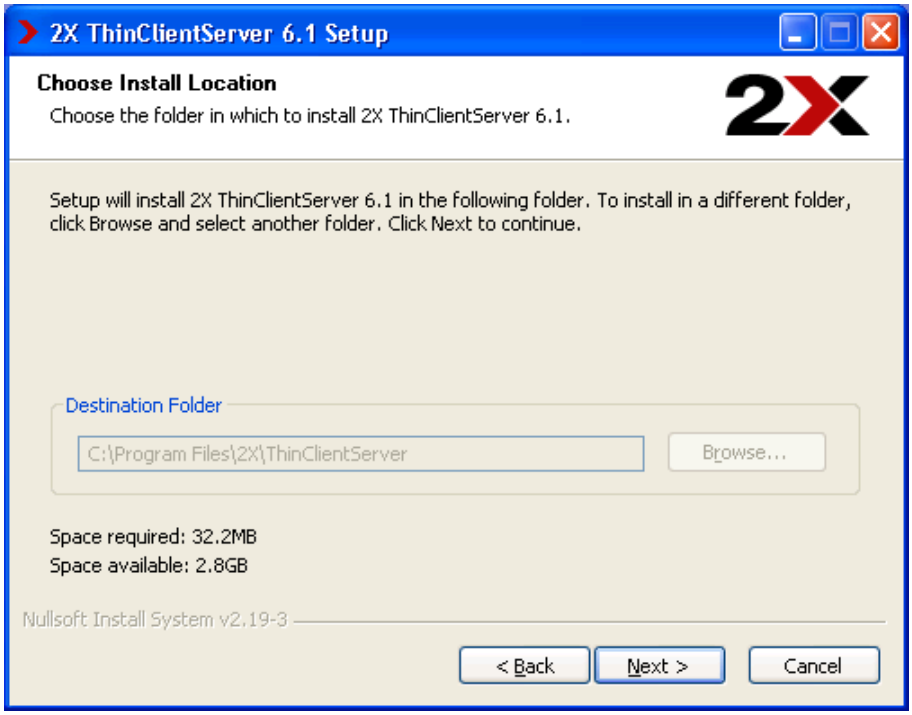
Screenshot 85: Installing the new version of 2X ThinClientServer

4. Click “Next” to proceed to the License agreement page.
5. Click “I Agree” to accept the License Agreement. You must accept the agreement to install 2X ThinClientServer.


2X ThinClientServer 6.1 Setup
License Agreement
Please review the license terms before installing 2X ThinClientServer 6.1.
Press Page Down to see the rest of the agreement.
END-USER LICENSE AGREEMENT (EULA)
SOFTWARE PRODUCT: 2X ThinClientServer 6.1
LICENSED COPIES: 1
IMPORTANT- READ CAREFULLY BEFORE COMPLETING THE INSTALLATION PROCESS AND USING THE SOFTWARE: This end-user license agreement ("EULA") is a legal agreement between you (an individual, a company, an organisation or another person or single entity) and 2X Software Ltd ("2X") for the 2X software product identified above,
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install 2X ThinClientServer 6.1.
Nullsoft Install System v2.19-3
< Back
I Agree
Cancel

Screenshot 86: The 2X ThinClientServer License Agreement

6. The next dialog will show you the destination folder where the upgraded files will be installed. Click “Next”.


2X ThinClientServer 6.1 Setup
Choose Install Location
Choose the folder in which to install 2X ThinClientServer 6.1.
Setup will install 2X ThinClientServer 6.1 in the following folder. To install in a different folder, click Browse and select another folder. Click Next to continue.
Destination Folder
C:\Program Files\2X\ThinClientServer
Browse...
Space required: 32.2MB
Space available: 2.8GB
Nullsoft Install System v2.19-3
< Back
Next >
Cancel

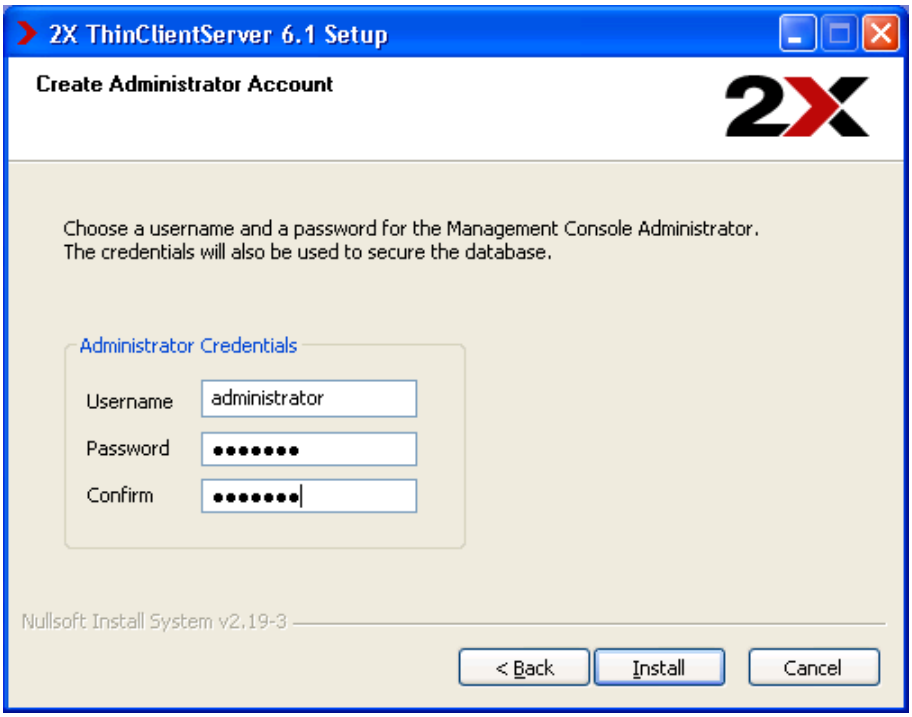
Screenshot 87: The Destination Folder

7. If you have multiple network cards, or multiple IP addresses on one network card, setup will ask you for the IP address to which the 2X ThinClientServer must bind. Select Auto unless you want to exclude a particular network card.

2X ThinClientServer 6.1 Setup
Choose Install Location
Choose the folder in which to install 2X ThinClientServer 6.1.
If this machine has more than one network card or IP address please specify the IP address which the webservice should use.
Web interface Settings
IP
Auto
If you use the 'Auto' setting, 2X ThinClientServer will accept connections from any network interface.
Nullsoft Install System v2.19-3
< Back
Next >
Cancel

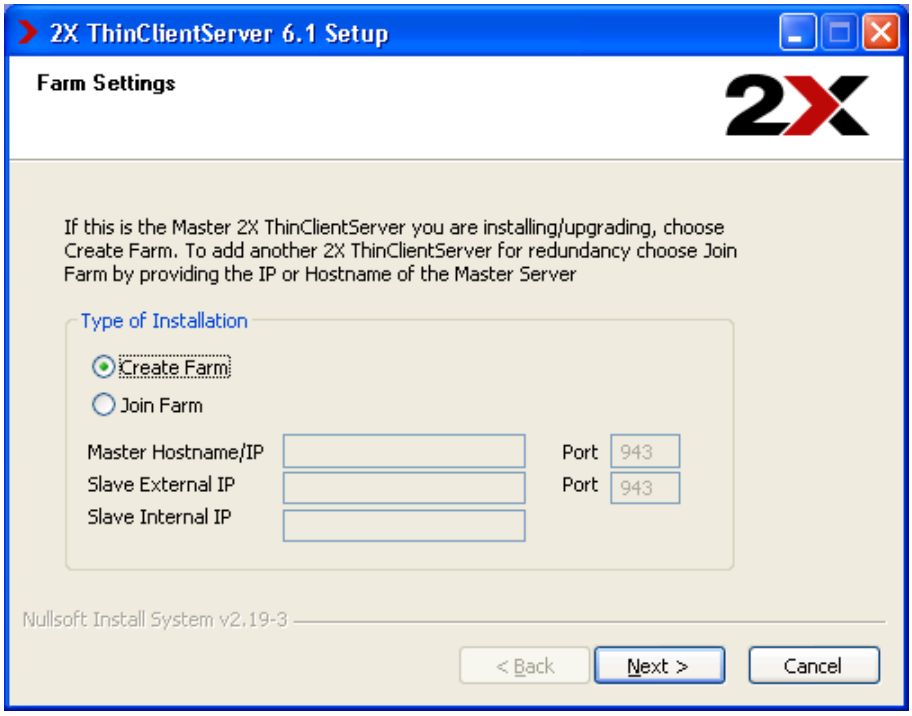
Screenshot 88: Choose the IP Address

8. Setup will ask you for a username and password for the settings to connect to the 2X ThinClientServer database. Note that the credentials for the Management Console will not change.



Screenshot 89: Insert Database Credentials

9. After all the files are copied setup will ask you whether you want to create a 2X ThinClientServer farm or join an existing farm. If this is the first time you are installing 2X ThinClientServer, choose “Create Farm”. If you want to add a 2X ThinClientServer to an existing installation to improve the deployment of thin clients in large installations, then choose “Join Farm” and enter the IP address of the 2X ThinClientServer hosting the farm (typically the first 2X ThinClientServer).


2X ThinClientServer 6.1 Setup
Farm Settings
If this is the Master 2X ThinClientServer you are installing/upgrading, choose Create Farm. To add another 2X ThinClientServer for redundancy choose Join Farm by providing the IP or Hostname of the Master Server
Type of Installation
Create Farm
Join Farm
Master Hostname/IP
Port
943
Slave External IP
Port
943
Slave Internal IP
Nullsoft Install System v2.19-3
< Back
Next >
Cancel

Screenshot 90: Creating or Joining a 2X ThinClientServer Farm

10. Setup will ask you to configure 2X ThinClientServer but unless there are any changes you can just click “Confirm”.

2X ThinClientServer 6.1 Setup
Configure your 2X ThinClientServer
To successfully configure your 2X ThinClientServer you will need to:
1) Login using the Management Console Administrator Credentials.
2) Follow the wizard to quickly setup your 2X ThinClientServer for first use.
3) Customise your 2X ThinClientServer configuration from the Management Console.
Nullsoft Install System v2.19-3
< Back
Next
Cancel

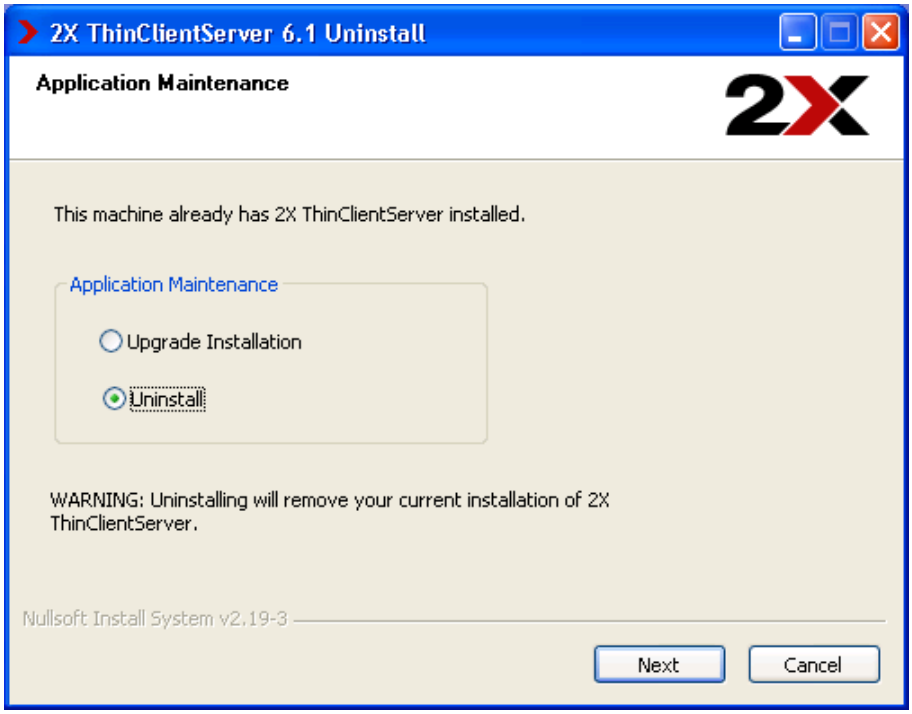
Screenshot 91: Configure your 2X ThinClientServer

11. Once you click Confirm setup will be complete. Click “Finish” to end the setup process.

Uninstalling 2X ThinClientServer

Uninstalling 2X ThinClientServer

1. Locate the “2X ThinClientServer 6.0” caption listed in the “Add/Remove Programs” application inside the Control Panel.
2. Click on the button “Change/Remove” to start the installation process.



Screenshot 92: Choose “Uninstall”

3. Choose the “Uninstall” option as shown above.
4. Click on “Next” to proceed with the un-installation.
5. Click on “Finish” when done.

   Warning: This will delete all data stored by ThinClientServer, including “Session”, “ThinClientOS” and “Connection” settings.

Firewall Settings

From:	To:	Port:	Description
Thin Client	2X TerminalServer	TCP 22	Remote Session
Thin Client	Citrix Server	TCP 1494	Remote Session
Thin Client	Citrix Server	TCP 443	Remote Session HTTPS
Thin Client	MS Terminal Server	TCP 3389	Remote Session
Thin Client	2X Application Server	TCP 3389	Remote Session
Thin Client	2X Application Server	TCP 80	Remote Session
Thin Client	DNS Server	UDP 53	Name Resolution
Thin Client	DHCP Server	UDP 67	TCP/IP Settings Retrieval
Thin Client	DHCP Helper	UDP 67	TCP/IP Settings Retrieval
Thin Client	NTP Server	UDP 123	Time synchronization
Thin Client	TFTP Server	UDP 69	Operating System Retrieval
Thin Client	DHCP Helper	UDP 4011	TCP/IP Settings Retrieval
Thin Client	2X ThinClientServer	TCP 943	Thin Client Settings
Web Browser	2X ThinClientServer	TCP 980	Management Console (HTTP)
2X TCS Slave	2X TCS Master	TCP 943	Replication queries
2X TCS Master	2X TCS Slave	TCP 943	Replication queries
2X TCS Master	Domain Controller	TCP 389	LDAP Queries
2X TCS Slave	Domain Controller	TCP 389	LDAP Queries
2X ThinClientServer	Thin Client	UDP 161	SNMP Client Status Information
2X ThinClientServer	Thin Client	UDP 68	TCP/IP Settings Delivery
2X ThinClientServer	downloads.2x.com	TCP 80	Automatic update checking
Admin PC	Thin Client	TCP 5800	Shadow Session Control
Admin PC	Thin Client	TCP 5900	Shadow Settings Control

Troubleshooting

When troubleshooting an error lookup the matching code from this section. If you require further information on what is happening on the thin client follow the instructions on how to contact support in Chapter 8 under the section “Support”.

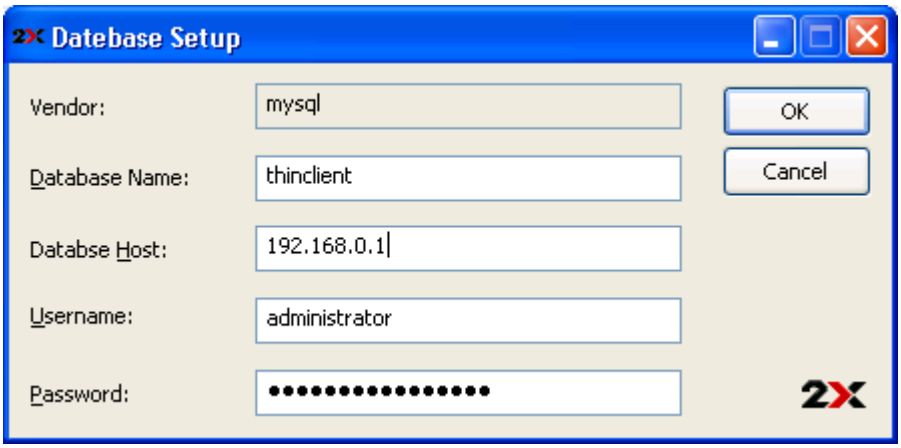
2X ThinClientServer External Database

2X ThinClientServer provides a small utility to change the IP address of the external database, should you need to change the IP address of the external database server.

You can launch the utility from Start > All Programs > 2X > ThinClientServer > Configure DB Access

From the utility you can edited

1. The name of the database.
2. The IP address of the database server where the 2X ThinClientServer database is hosted.
3. The username of the database administrator.
4. The password of the database administrator.



Screenshot 93: Database Setup

2X ThinClientOS Boot Process Error Messages

TCMR001 /proc filesystem already mounted!

Corrupt installation detected. Please contact 2X Technical Support.

TCMR002 Installer package not available.

Corrupt installation detected. Please refer to Chapter 6 and review the methodologies for creating a bootable CD from an ISO file. For further assistance please contact 2X Technical Support.

TCMR003 Distribution not found.

Corrupt installation detected. Please refer to Chapter 6 and review the methodologies for creating a bootable CD from an ISO file. For further assistance please contact 2X Technical Support.

TCMR004 Not enough memory to create root partition in ram.

Insufficient memory for correct operation. Please refer to minimum hardware specifications in Chapter 14.

TCMR005 Unable to load unionfs module.

Corrupt installation detected. Please contact 2X Technical Support.

TCMR006 Unable to mount distribution media.

Reconfigure your thin client's BIOS settings to disable DMA or UDMA features on all IDE channels. Please contact 2X Technical Support.

TCMR007 Distribution version mismatch.

Corrupt installation detected. Please contact 2X Technical Support.

TCMR008 rootdisk.img failed integrity check.

Corrupt installation detected. Please refer to Chapter 6 and review the methodologies for creating a bootable CD from an ISO file. For further assistance please contact 2X Technical Support.

TCMR011 install.img failed integrity check.

Corrupt installation detected. Please refer to Chapter 6 and review the methodologies for creating a bootable CD from an ISO file. For further assistance please contact 2X Technical Support.

TCMR012 Unable to mount rootdisk image.

Corrupt installation detected. Please refer to Chapter 6 and review the methodologies for creating a bootable CD from an ISO file. For further assistance please contact 2X Technical Support.

TCMR015 Unable to mount installer image.

Corrupt installation detected. Please refer to Chapter 6 and review the methodologies for creating a bootable CD from an ISO file. For further assistance please contact 2X Technical Support.

TCMR016 Unable to pivot to new root.

Corrupt installation detected. Please contact 2X Technical Support.

TCMR018 Unable to update rootdisk image.

Hard Disk error detected. Please re-install 2X ThinClientOS to attempt to resolve this issue. If this error persists after repeated re-installation, it is likely that the only solution will be to replace the faulty Hard Disk.

TCMR020 Kernel version is unsupported.

The version of the loaded OS is not a version supported by the 2X ThinClientOS. Check that the correct files were installed on the system. For further assistance please contact 2X Technical Support.

TCMR021 Unable to load USB drivers.

The drivers for USB support on this device were not loaded successfully. Try to change between USB2/USB1 to enable support or disable the driver if the problem persists.

2X ThinClientOS Autoconfiguration Error Messages

TCAC001 No network devices were detected.

A network card was not detected by 2X ThinClientOS. Make sure that a working network card is installed on the thin client. If a network card is correctly installed and you still encounter this problem, please send us the full technical details of the model and manufacturer of the card in question.

TCAC002 No network settings were received from the DHCP service.

If no settings are provided by the DHCP service, or if the settings provided are incomplete, you should consult Chapter 3. The following settings are required for 2x ThinClientOS to boot up:

- A working DHCP server
- An IP address

- A record to a DNS server
- A DNS suffix

Should you be doing a PXE install you may optionally need:

- An entry for *thinsrv* pointing to your 2X ThinClientServer
- An entry to the IP address of the TFTP server providing the boot image and settings. If you are using the TFTP server bundled with 2X ThinClientServer then the IP address is the same as that of 2X ThinClientServer
- An entry for the path of the PXE loader called pxelinux.0

TCAC003 Unable to mount root file system read-only.

Corrupt installation; reinstall 2X ThinClientOS.

TCAC004 Unable to mount root file system read/write.

Corrupt installation, reinstall 2X ThinClientOS.

TCAC005 Unable to correct root file system errors.

Corrupt installation, reinstall 2X ThinClientOS.

TCAC006 Started in install mode however installer is not available.

The installation package couldn't be loaded from the Server or CD/USB.

TCAC007 No settings were received from the 2X ThinClientServer.

2X ThinClientOS was unable to contact the 2X ThinClientServer. Either the 2X ThinClientServer is off, or otherwise inaccessible. Check your firewall configuration.

2X ThinClientOS Update Error Messages

TCUP001 Unable to download latest package version.

No 2X ThinClientOS was uploaded to 2X ThinClientServer. This can be obtained as a ZIP file from:

http://www.2x.com/downloads

Please refer to the chapter entitled "Configuring 2X ThinClientServer"

TCUP002 Unable to download X11R6 package.

There seems to be an error while downloading the Video package for 2X ThinClientOS. In the case of PXE booting this may be due to insufficient memory on the thin client. If you have performed a Hard Disk installation, this may be due to insufficient space.

TCUP004 Unable to download rootdisk package.

There seems to be an error while downloading the 2X ThinClientOS package. In the case of PXE booting this may be due to insufficient memory on the thin client. If you have performed a Hard Disk installation, this may be due to insufficient space.

TCUP005 Unable to download minird package.

There seems to be an error while downloading the pre-boot image. In the case of PXE booting this may be due to insufficient memory on the thin client. If you have performed a Hard Disk installation, this may be due to insufficient space.

TCUP006 Unable to download kernel package.

There seems to be an error while downloading the kernel package for 2X ThinClientOS. In the case of PXE booting this may be due to insufficient memory on the thin client. If you have performed a Hard Disk installation, this may be due to insufficient space.

TCUP008 X11R6 package failed integrity check.

A corruption has occurred in the package downloaded from 2X ThinClientServer. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP010 Failed to overlay X11R6 package.

A corruption has occurred in the package downloaded from 2X ThinClientServer. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP014 Unable to access temporary filesystem.

2X ThinClientOS has run out of memory used during the update process.

TCUP015 Unable to mount X11R6 package.

A corruption has occurred in the package downloaded from 2X

ThinClientServer. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP017 Unable to mount services package.

A corruption has occurred in the package downloaded from 2X ThinClientServer. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP018 Failed to overlay services package.

A corruption has occurred in the package downloaded from 2X ThinClientServer. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP019 Services package failed integrity check.

A corruption has occurred in the package downloaded from 2X ThinClientServer. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP020 Unable to download services package.

There seems to be an error while downloading the services package for 2X ThinClientOS. In the case of PXE booting this may be due to insufficient memory on the thin client. If you have performed a Hard Disk installation, this may be due to insufficient space.

TCUP024 2X ThinClientServer has insufficient licences to start your session.

2X ThinClientServer has run out of licences while setting up this client. Purchase additional licences to implement more thin clients

TCUP025 2X ThinClientServer licence has expired.

The licence for 2X ThinClientServer has expired. Please purchase a licence to continue using 2X ThinClientServer.

TCUP029 Unable to overwrite kernel with update.

An error has occurred while replacing kernel with a newer version. This may be due to lack of space on the 2X ThinClientOS or a corruption on the hard disk.

TCUP030 Unable to overwrite minird with update.

An error has occurred while replacing a package with a newer version.

This may be due to lack of space on the 2X ThinClientOS or a corruption on the hard disk.

TCUP031 Unable to copy rootdisk update.

An error has occurred while copying new package version to disk. This may be due to lack of space on the 2X ThinClientOS or a corruption on the hard disk.

TCUP034 Unable to remount media as read/write.

An error has occurred while trying to configure hard disk for read/write access. This may be due to a corruption on the hard disk.

TCUP035 Unable to remount media as read-only.

An error has occurred while trying to configure hard disk for read-only access. This may be due to a corruption on the hard disk.

TCUP036 Unable to download install package.

An error has occurred while trying to download package from the network. This may be due to a network transmission error or 2X ThinClientServer is no longer available.

TCUP037 Unsupported running kernel version.

The version of the loaded OS is not a version supported by the 2X ThinClientOS. Check that the correct files were installed on the system. For further assistance please contact 2X Technical Support.

TCUP038 Unable to download checksum list.

An error has occurred while trying to fetch the package integrity checksums. This may be due to a network transmission error or 2X ThinClientServer is no longer available.

TCUP039 Rootdisk package doesn't match checksum.

A corruption has occurred in the rootdisk package. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP040 Minird package doesn't match checksum.

A corruption has occurred in the minird package. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP041 Kernel package doesn't match checksum.

A corruption has occurred in the kernel package. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP043 Installer package doesn't match checksum.

A corruption has occurred in the installer package. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP044 Kernel options do not match checksum.

A corruption has occurred in the boot option settings sent by the ThinClientServer. This may be due to an error in the file hosted on the 2X ThinClientServer, a network transmission error, or lack of space on the 2X ThinClientOS.

TCUP045 Unable to download kernel options.

An error has occurred while trying to download the default boot options from the network. This may be due to a network transmission error or 2X ThinClientServer is no longer available.

TCUP046 No settings were received from 2X ThinClientServer.

2X ThinClientOS was unable to contact the 2X ThinClientServer. Either the 2X ThinClientServer is off, or otherwise inaccessible. Check your firewall configuration.

TCUP047 Unable to download USB packages from 2X ThinClientServer.

An error has occurred while trying to download the packages necessary for USB support. This may be due to a network transmission error or the 2X ThinClientServer is no longer available.

2X ThinClientOS Video Error Messages

TCXS001 Failed to start in graphical mode.

2X ThinClientOS failed to start graphics mode correctly. A VESA

compatible video card is required to start in graphical mode. Please contact 2X Technical Support with the exact details of the Manufacturer and Model of the video card used as well as that of the monitor.

TCSX001 No configuration was returned by 2X ThinClientServer.

2X ThinClientOS failed to receive the required configuration file from the 2X ThinClientServer. This could be possible to a misconfigured server or a server mismatch. Please check that the 2X ThinClientServer and 2X ThinClientOS are installed correctly.

TCSX002 Video card driver corrupted.

The video card driver needed for the thin client has been downloaded incorrectly or is corrupted. In the case of CD booting, make sure that the CD was burnt correctly. In the case of HD booting, make sure the ThinClientOS is not running out of disk space. In case of PXE booting, make sure that enough ram is available for the ThinClientOS as described in the minimum requirements section.

TCSX003 Wrong number of parameters in config_device()

The video card has been initialized incorrectly with the wrong set of parameters. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSX004 Internal error.

Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSX005 Wrong number of parameters in config_device_dual()

The video card has been initialized incorrectly with the wrong set of parameters. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSX006 Internal error.

Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSX007 No working configuration was found.

All possible video configurations have been attempted and no working configuration was found. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSX008 Unable to download video card driver.

There seems to be an error while downloading the video card driver for the 2X ThinClientOS. In the case of PXE booting this may be due to insufficient memory on the thin client. If you have performed a Hard Disk installation, this may be due to insufficient space

TCSX009 No banner was received from 2X ThinClientServer.

There seems to be an error while downloading the logon banner for 2X ThinClientOS. In the case of PXE booting this may be due to insufficient memory on the thin client. If you have performed a Hard Disk installation, this may be due to insufficient space

2X ThinClientOS Sessions Error Messages

TCSP001 Missing session settings, aborting login session.

2X ThinClientServer failed to send one or more required settings. This could be caused by a network transmission error or 2X ThinClientServer is no longer available.

TCSP002 Failed top delete package cache.

An error has occurred while purging the package cache. This could be caused by a system corruption or failing hardware.

TCSP003 Package not available on CDROM.

A required package was not found on the CDROM media. This could be caused by a corrupted CD media or failing hardware.

TCSP004 Missing configuration files.

Required configuration file are no longer available on the system. This could be caused by a corrupted system or failing hardware.

TCSP006 Unable to download package from 2X ThinClientServer.

An error has occurred while downloading package from 2X ThinClientServer. This could be caused by a network transmission error or 2X ThinClientServer is no longer available.

TCSP008 Package failed integrity check.

A corruption has occurred in the package downloaded from 2X ThinClientServer. This may be due to an error in the file hosted on 2X ThinClientServer, a network transmission error, or lack of space

on the hard disk.

TCSP009 Unable to mount package.

An error has occurred while loading the package into the system. This may be caused by a network transmission error or hardware failure.

TCSP010 Failed to overlay package.

An error has occurred while configuring the system with the new package. This may be caused by a system corruption or hardware failure.

TCSP011 Unable to copy download package from temporary location.

There seems to be an error while copying a package inside the 2X ThinClientOS. In the case of PXE booting this may be due to insufficient memory on the thin client. If you have performed a Hard Disk installation, this may be due to insufficient space or corruption.

TCSP012 Unable to remove package from local storage.

A system package couldn't be removed during the update process. This can be due to hard disk corruption or bad memory.

TCSS001 Missing connection settings, aborting login session.

An error has occurred while provisioning settings to the 2X ThinClientOS. Either a corruption has occurred over the line or else there is some misconfiguration in the connection settings. Please double check your connection settings and associated protocol.

TCSS002 Your connection requires an NX session however the client is not available.

The 2X ThinClientOS you are using is designed for a different Terminal Server. Please contact your administrator to obtain a version of 2X ThinClientOS targeted for an NX session.

TCSS003 Your connection requires an RDP session however the client is not available.

The 2X ThinClientOS you are using is designed for a different Terminal Server. Please contact your administrator to obtain a version of 2X ThinClientOS targeted for an RDP session.

TCSS004 Your connection requires an ICA session however the client is not available.

The 2X ThinClientOS you are using is designed for a different Terminal Server. Please contact your administrator to obtain a version of 2X ThinClientOS targeted for an ICA session.

TCSS005 Your RDP session terminated abnormally.

A network error has occurred while connected to your Remote Session. This can be due to incorrect settings or else due to the session being interrupted from the Terminal Server. If this is not the case make sure that the thin client is not experiencing any memory corruption or network outages, or is out of disk space.

TCSS006 Your ICA session terminated abnormally.

A network error has occurred while connected to your Remote Session. This can be due to incorrect settings or else due to the session being interrupted from the Terminal Server. If this is not the case make sure that the thin client is not experiencing any memory corruption or network outages or is out of disk space.

TCSS007 Unable to logoff user from session.

A network error has occurred while connected to your Remote Session. This can be due to incorrect settings or else due the session being interrupted from the Terminal Server. If this is not the case make sure that the thin client is not experiencing any memory corruption or network outages or is out of disk space.

TCSS008 Your NX session terminated abnormally.

A network error has occurred while connected to your Remote Session. This can be due to incorrect settings or else due the session being interrupted from the Terminal Server. If this is not the case make sure that the thin client is not experiencing any memory corruption or network outages or is out of disk space.

TCSS009 Empty password is not permitted in an NX session.

An empty password is not permissible to establish a valid session to 2X TerminalServer. Please supply credentials with a valid username and the respective valid, non-empty, password.

TCSS010 Your connection requires a local desktop however the window manager is not available.

A required component to configure your system as a local desktop is missing. This could be caused by a corrupted package.

TCSS011 Your connection requires RDP published applications however the client is not available.

A required component to access RDP publish applications is missing. This could be caused by a corrupted package.

TCSS012 Your desktop session terminated abnormally.

An error has occurred during the desktop session. This could be caused by a corrupted system or faulty hardware.

TCSS013 Your connection requires ICA published applications however the client is not available.

A required component to access ICA publish applications is missing. This could be caused by a corrupted package.

TCSS014 Missing thin client settings, aborting login session

2X ThinClientServer failed to send one or more required settings. This could be caused by a network transmission error or 2X ThinClientServer is no longer available.

TCSS015 Missing session settings, aborting login session

2X ThinClientServer failed to send one or more required settings. This could be caused by a network transmission error or 2X ThinClientServer is no longer available.

TCSS017 An error has occured to populate the 2X managed desktop.

The list of published applications has caused an error in creating the appropriate 2X managed desktop. Reduce the list of published applications to identify which is the problem.

TCSS018 No published applications are available.

The user has no published applications available from the Terminal Server farm. Please check the applications provisioning for the particular user.

TCSS020 No published applications are available.

The user has no published applications available from the Terminal Server farm. Please check the applications provisioning for the particular user. Also check that all IP addresses and ports to the Farm are set correctly and that the username with the given domain and credentials have access to a set of applications.

TCSS021 Unable to populate protocol sessions.

An error has occurred when transferring the list of session settings for the user from the ThinClientServer. This could be due to a network error or due to a missing setting which is still registered to that user.

TCSS022 Unable to retrieve session settings from 2X ThinClientServer.

An error has occurred when transferring the list of session settings for the user from the cached store. This could be due to file corruption or due to a missing setting which is still registered to that user.

TCSS023 The administrator has terminated your session.

The administrator has forcefully stopped your session from the 2X ThinClientServer Management Console.

TCSS025 Your desktop requires Opera but it is not available.

A required component to run the Opera Web browser is missing. This could be caused by a corrupted package or lack of resources on the thin client.

TCSS026 Your desktop requires Flash but it is not available.

A required component to run the Flash plugin inside the Web browser is missing. This could be caused by a corrupted package or lack of resources on the thin client.

TCSS027 Your desktop requires Java but it is not available.

A required component to run the Java Virtual Machine is missing. This could be caused by a corrupted package or lack of resources on the thin client.

TCSS028 The server with your published applications could not be contacted. Check that your network settings are correct.

A problem occurred when trying to contact the published application server due to the network settings that are currently being used by the thin client. Make sure that the server is reachable and that all hostnames and domain suffixes can be resolved. Also check that no ports on the server are blocked. Use the network diagnostics tool to troubleshoot this problem.

TCSS029 Invalid credentials when connecting to <*host*>.

The credentials supplied to the 2X desktop are not valid for this host. Make sure that the username, password as well as the domain are correct.

2X ThinClientServer (Windows) Slave Redundancy Error Messages

TCSRD001 This is not the master server.

The IP/hostname of the server you provided is not a 2X ThinClientServer in master mode.

TCSRD002 The master cannot reach the slave server.

The external IP/hostname of the slave server is not reachable by the master 2X ThinClientServer. Make sure that the network configuration is correct and that the address is routable. Also, ensure that no ports are blocked by a firewall.

TCSRD003 Schema Mismatch.

The database schema of the master server does not match the one installed on this slave server. Make sure that the versions of the both the master server and of this server match. If the error persists, follow the instructions to generate a debug log and send it to the 2X Support Centre.

TCSRD004 Session Error.

An error has occurred during the replication process. This can be due to a network error or to lack of resources on the master of slave server.

TCSRD005 Invalid console credentials.

The credentials provided for the master 2X ThinClientServer do not match the credentials used in the Management Console. Verify that the credentials are correct in the Management Console and try again.

TCSRD006 Administrator does not have the rights to install new slaves in this farm.

You do not have enough rights to install a slave server. Contact your administrator.

TCSRD007 Cannot get mysqldump.

A critical error has occurred when replicating the database contents. Follow the instructions to generate a debug log and send it to the 2X Support Centre.

TCSRD008 Invalid or expired licence key.

Contact your 2X ThinClientServer sales representative for an Enterprise Edition licence key.

TCSRD051 Cannot open session lock file.

An error has occurred when attempting to read the session lock file. Make sure that you have the sufficient credentials to perform these operations.

TCSRD052 Cannot write session lock file.

An error has occurred when attempting to write the session lock file. Make sure that you have the sufficient credentials to perform these operations.

TCSRD053 Cannot connect to the master server.

The IP/hostname of the master server is not reachable by this server. Make sure that the network configuration is correct and that the address is routable. Also, ensure that no ports are blocked by a firewall.

TCSRD054 Missing parameters.

An internal error has occurred. Follow the instructions to generate a debug log and send it to the 2X Support Centre.

TCSRD055 File transfer error.

An error has occurred during the replication process. Please try again. If the error persists, check that the network connection is working properly.

TCSRD056 File open error.

A required file in the replication process is missing. Ensure that all ThinClientOS images on the master server are installed correctly. If the problem persists, follow the instructions to generate a debug log and send it to the 2X Support Centre.

TCSRD057 File write error.

A required file in the replication process could not be written.

Ensure that you have enough permissions to complete the replication process and that there is enough disk space to replicate the master server. If the problem persists, follow the instructions to generate a debug log and send it to the 2X Support Centre.

TCSRD058 Cannot register the slave server.

An error has occurred when registering the slave in the database. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSRD059 Post update schema mismatch.

The schema that was replicated does not match the schema which was originally installed on the slave server. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSRD065 Cannot open server_id.

An error has occurred when trying to identify the ID of the master server. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSRD066 Cannot write server_id.

An error has occurred when trying to register the identity of the slave server. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSRD067 Cannot add new server entry to local database.

An error has occurred when registering the slave in the database. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TCSRD070 Cannot remove directory content.

Ensure that you have enough rights to the folder containing the ThinClientOS images on the slave server.

TCSRD071 Cannot create licence file.

An error has occurred when attempting to write the session lock file. Make sure that you have the sufficient credentials to perform these operations.

TCSRD072 Cannot write licence file.

An error has occurred when attempting to write the session lock file. Make sure that you have enough disk space.

TCSRD073 License file transfer error.

An error has occurred when transferring the licence to the slave server.

TCSRD099 An error has occured in the replication process.

The installation could not be completed successfully due to an error that occurred during part of the installation.

2X ThinClientServer (Linux) Install Error Messages

TSIN001 A critical internal error occurred while executing the installation scripts.

The installation could not be completed successfully due to an error that occurred during part of the installation.

TSIN002 Either critical tools are missing or could not detect critical directories. Please check the 2X files under /tmp.

Before proceeding with the installation the package checks for all the required tools and important directories. This error is displayed if either a required tool or an important directory is missing.

TSIN003 Could not create the directory/file log structure. Please check the 2X files under /tmp.

During the installation a random directoy is created under /tmp that contains the current installation log files. If this directory cannot be created this error message is displayed.

TSIN004 Could not service request <*xml request*>.

This is a generic error message that is displayed when a particular xml request could not be complete. Please review the error message for more information about what is causing the problem.

TSIN005 Could not read information from the XML report file. Please check that the 2X report file 2Xdetectionreport.xml exists.

This error is displayed when the xml request does not return any information.

TSIN006 The previous installation might be corrupt. Please remove it completely and re-install your latest version.

An error has occurred during the update which does not allow you to use your previous version of 2X ThinClientServer. Uninstall your current versions and install your latest version.

TSIN007 The FQDN and the local hostnames resolve to different IPs.

The IP addresses resolved by the Fully Qualified Domain Name (FQDN) and the local hostname do not match. Please check your network configuration.

TSIN008 The resolved IPs are not bound to any physical interfaces or local hosts.

A safety check is done to determine whether the IP addresses resolved by the Fully Qualified Domain Name (FQDN) and local hostname are bound to a local interface.

TSIN009 Could not resolve both local and FQDN hostnames.

The installation could not resolve both the FQDN and local hostname. This could create an unreachable connection.

TSIN010 Cannot ping the resolved IP. Installation will continue.

The IP resolved by the DNS could not be reached. Please check your network configuration.

TSIN011 Cannot resolve the FQDN. Fixing configuration.

The /etc/hosts file is modified such that the Fully Qualified Domain Name (FQDN) resolves to the local machine.

TSIN012 Either local hostname or FQDN setting is empty. Fixing configuration.

The /etc/hosts file is modified such that the Fully Qualified Domain Name (FQDN) or the local hostname resolve to the local machine.

TSIN013 Cannot resolve local hostname. Fixing configuration.

The /etc/hosts file is modified such that the local hostname resolves to the local machine.

TSIN014 Cannot create or modify the services' users or group .

Each service has its own set of credentials that are created or modified during installation. This error message will be displayed if this process fails.

TSIN015 Could not install/configure the services' wrapper scripts.

Each service is managed by a wrapper script that sets the required paths and libraries. This error occurs if these scripts cannot be configured during installation.

TSIN016 There were errors when setting up the configuration files.

During setup, the configuration files could not be configured with the settings entered by the administrator. Please restart the configuration script and try again.

TSIN017 Could not create important DHCP Helper files or the releases, backup, log files, and upload directories.

Some important files and directories involving the dhcphelper could not be created

TSIN018 Cannot secure critical directories and files.

The setting of permissions during installation was not completed successfully.

TSIN019 Could not register our services in the /etc/services file. Installation will continue.

The installation registers the DHCP Helper service in /etc/services file. If this fails this error will be displayed.

TSIN020 Could not install services start up script.

This error will be displayed if the services start up script could not be installed in the /etc/init.d directory.

TSIN021 Could not remove the MySQL database.

The MySQL database in the /var/opt/2X/thinclientserver/mysql/data/ could not be deleted during installation.

TSIN022 Could not install the MySQL database.

The post-install script could not install the MySQL databases

necessary to store configuration information. 2X ThinClientServer installation cannot proceed. The log file indicated will provide further details to identify the issues affecting your server relevant to this error to assist in resolving the issue.

TSIN023 Could not start/stop the MySQL server. Please check both the MySQL error log file under /var/opt/2X/thinclientserver/mysql/data/2XTCSmysql.err and the 2Xlogreport.txt file.

The post-install script could not start/stop the MySQL database engine necessary to store configuration information. The 2X ThinClientServer installation cannot proceed. The log file indicated will provide further details to identify the issues affecting your server relevant to this error to assist in resolving the issue.

TSIN024 Could not install/upgrade the 2X ThinClientServer database.

The post-install script could not update the MySQL databases necessary to store configuration information. The 2X ThinClientServer installation cannot proceed. The log file indicated will provide further details to identify the issues affecting your server relevant to this error to assist in resolving the issue.

TSIN025 Could not secure the the databases directory.

Permissions to secure the database directory for 2X ThinClientServer could not be applied.

TSIN026 Cound not finalise the installation.

While finalising the installation the configuration files could not be identified as being configured properly. This will cause the installation to fail. Please try reinstalling the product.

TSIN027 Could not load the init.d path from detection file. Will try to detect path using the find command.

When uninstalling the product the installer fetches the init.d directory path from the XML file generated during installation. If the XML file is not found the installation will try to find the path using the Find utility.

TSIN028 Could not find the critical directories. Cannot continue the un-installation.

The paths to the init.d and run level directories must be known so that the 2X ThinClientServer service can be removed. If these directories are not found than the un-installation cannot be

completed.

TSIN029 Could not load the run level paths from detection file. Will try to detect path using the find command.

When uninstalling the product the installer fetches the run level directory paths from the XML file generated during installation. If the XML file is not found, the installation will try to find the path using the Find utility.

TSIN030 Could not un-install the 2X thinclientserver service and associated links.

This error occurs when the 2X ThinClientServer service and associated run level links cannot be removed from the init.d and run level directories.

TSIN031 Cannot secure directories under /var/opt and /etc/opt or remove the installation directory.

The un-installation process does not remove the data and configuration directories. It only removes the binaries directory. If it fails to either remove the binaries directory or secure the remaining directories this error will be displayed.

TSIN032 Could not remove users/group. Either these do not exist or there were some errors during removal. Please check.

This error occurs if the un-installation process could not remove the services' user accounts and group.

TSIN033 Could not un-register our services from the /etc/services file. Please check for 2X comment lines and remove.

This error is generated if during un-installation, the DHCP Helper service could not be removed from the /etc/services file. The service can manually be removed by editing the file /etc/services

TSIN034 The machine's host name starts with a number. Please re-configure the host name if you experience problems.

The machine's host name should not start with a number. Please check you settings to make sure that it starts with a letter.

TSIN035 Could not create the libexpat.so.0 link.

The installation process checks for the existence of libexpat.so.0

link. If this link is not found the installation process will try to create it. This error is displayed if this link could not be created.

TSIN036 Errors were encountered when un-installing the 2X ThinClientServer AppArmor profiles.

This error only applies if AppArmor is running. During the un-installation process the AppArmor profiles are removed from the /etc/apparmor.d directory. This error occurs when this process could not be completed.

TSIN037 Could not copy database upgrade scripts to the htdocs directory.

This error occurs when the thin client database upgrade scripts could not be copied to the Apache htdocs directory.

2X ThinClientServer (Linux) Configuration Error Messages

TSCS001 A critical internal error occurred while executing the configuration scripts.

An unexpected error occurred during the execution of the configuration script.

TSCS002 Failed to initialize XML report file.

The XML report file could not be created in the /tmp directory.

TSCS003 Failed to detect critical tools.

Some tools that are necessary for the execution of the script are missing.

TSCS004 Could not backup the configuration files.

Before starting configuration the old configuration files are backed up. This error is displayed if this process fails.

TSCS005 Could not create the directory/file log structure.

During the installation a random directory is created under /tmp that contains the current installation log files. If this directory cannot be created this error message is displayed.

TSCS006 The appropriate EULA file for your language setting is missing.

The EULA file for your current language is missing.

TSCS007 A suitable pager, to display the EULA file, was not detected. Please check that you have the less, more, or cat utilities installed.

To display the EULA file on screen one of the following pagers must be installed on the system: less, more or cat. Please install either one of them and restart the configuration.

TSCS008 Could not display the EULA file.

This error can be generated due to a number of reasons. Please check if the EULA file is installed in the /opt/2X/thinclientserver/msgdb/<*language*>.

TSCS009 Could not restore previous backed up configuration files.

This error is generated if the backed up configuration files are either missing or corrupt.

TSCS010 Failed to detect the path for the init.d directory.

The path to the init.d directory is critical for the configuration script to be able to check, start or shutdown the 2X ThinClientServer services.

TSCS011 Unable to call the startup script due to missing path.

The path to the init.d directory is critical for the configuration script to be able to check, start or shutdown the 2X ThinClientServer services.

TSCS012 No physical network interface was detected.

Your machine does not have a network card installed. Please check your drivers and/or you device if you already have a network card connected to your machine.

TSCS013 Please configure the conflicting services on a different port and run the configuration script again.

This error is displayed when there are services which might conflict with the 2X ThinClientServer services. Please configure these services on a different port and run the configuration script again.

TSCS014 Could not remove the MySQL database.

The MySQL database in the /var/opt/2X/thinclientserver/mysql/data/ could not be deleted during installation.

TSCS015 Could not install the MySQL database.

The configuration script was unable to create the necessary MySQL databases. The 2X ThinClientServer configuration cannot proceed. The log file (/var/opt/2X/thinclientserver/mysql/data/2XTCSmysql.err and the 2Xlogreport.txt) will provide further details relevant to this error to assist in resolving the issue.

TSCS016 Could not start/stop the MySQL server. Please check both the MySQL error log file under /var/opt/2X/thinclientserver/mysql/data/2XTCSmysql.err and the 2Xlogreport.txt file.

The configuration script was unable to start/stop the MySQL server. The 2X ThinClientServer configuration cannot proceed. The log file indicated will provide further details relevant to this error to assist in resolving the issue.

TSCS017 Could not install/upgrade the 2X ThinClientServer database.

The post-install script could not update the mysql databases necessary to store configuration information. The 2X ThinClientServer installation cannot proceed. The log file indicated will provide further details to identify the issues affecting your server relevant to this error to assist in resolving the issue.

TSCS018 Could not secure the the databases directory.

Permissions to secure the database directory for 2X ThinClientServer could not be applied.

TSCS019 Could not configure the Apache Web service.

The Apache Web service used to display the 2X ThinClientServer interface could not be configured.

TSCS020 Could not configure the DHCP Helper service.

The DHCP Helper service used during PXE booting of thin clients could not be configured.

TSCS021 Could not configure the TFTP service.

The TFTP service used to serve the kernel and root disk images during PXE booting of thin clients could not be configured.

TSCS022 Could not backup the XML report and log files.

When the configuration finishes, the XML report and log files are backed up for safe keeping. This error is displayed if the backing up process fails.

TSCS023 The appropriate SELinux file for your language setting is missing.

The SELinux read-me file for your current language is missing

TSCS024 Could not display the SELinux file.

Please check if the SELinux file is installed in the /opt/2X/thinclientserver/msgdb/<*language*>.

TSCS025 Could not perform a backup of the audit log file under /var/log/audit.

A backup of the /var/log/audit file is saved before the audit log is cleared. This error occurs if the backup operation fails

TSCS026 Could not determine the necessary SELinux rules to add to the configured policy.

If SELinux has been enabled, the configuration script will check whether the 2X ThinClientServer services will run properly. If this is not the case, SELinux rules are determined so that the services can be run properly. This error will be displayed if no rules can be detected.

TSCS027 Could not display the SELinux rules file. Please check under /var/opt/2X/thinclientserver/backup directory.

The SELinux rules are saved to a file in the /var/opt/2X/thinclientserver/backup directory. This is done so that the user can confirm whether he/she wants the rules to be applied to the installed SELinux policy. This error is displayed if the rules file is missing.

TSCS028 Could not detect the installed policy name.

The configuration script could not detect the installed SELinux policy name.

TSCS029 Unable to install the necessary packages.

The configuration script could not install the necessary SELinux packages to be able to configure the SELinux policy.

TSCS030 Could not backup the current policy directory.

Before attempting any SELinux policy configuration changes, the old policy directory is backed up. If the backup process fails, this error will be displayed.

TSCS031 Failed to append the custom rules to the policy's local.te file.

The configuration script failed to add the SELinux determined rules to the policy's local.te file.

TSCS032 Unable to rebuild and load the new policy.

The SELinux policy was not rebuilt and reloaded successfully. This is necessary for changes to the policy to take effect.

TSCS033 Failed to compile the 2Xthinclientserver policy module.

The 2Xthinclientserver policy module failed to compile. This is necessary before packaging and loading the module.

TSCS034 Could not package the compiled 2Xthinclientserver policy module.

The SELinux tools failed to package the compiled 2Xthinclientserver policy module.

TSCS035 Could not move the new 2Xthinclientserver policy module to the policy share directory.

The configuration script failed to copy the new 2Xthinclientserver policy module to the policy share directory. This is necessary before loading the 2Xthinclientserver policy module.

TSCS036 Could not load the new 2Xthinclientserver policy module.

The configuration script failed to load the new 2Xthinclientserver policy module from the policy share directory. This is necessary for the policy changes to take effect.

TSCS037 Could not switch SELinux to permissive mode.

The configuration script failed to set the SELinux state to

permissive mode before trying to determine the SElinux rules.

TSCS038 Could not switch SELinux to enforcing mode.

The configuration script failed to set the SELinux state to enforcing mode before trying to test whether the 2X ThinClientServer services started correctly.

TSCS039 Could not populate the list of AppArmor profiles to install.

If AppArmor is enabled a set of profiles is installed into the /etc/apparmor.d directory. This process cannot be done if the configuration script cannot acquire the list of the profiles to install.

TSCS040 Could not configure AppArmor profiles.

Due to the RPM package being re-locatable, the AppArmor profiles must be configured with the new installation path. The AppArmor profiles cannot be activated unless they are configured.

TSCS041 Could not install AppArmor profiles under /etc/apparmor.d directory.

This error will be displayed when the configured profiles cannot be copied in the /etc/apparmor.d directory. This could be either a question of permissions or a case of missing profiles.

TSCS042 Could not activate AppArmor profiles.

After the profiles are copied to the /etc/apparmor.d directory, they must be activated for them to take effect. This is done by reloading all AppArmor profiles in the /etc/apparmor.d directory. Check that the 2X ThinClientServer profiles have been copied in the /etc/apparmor.d directory.

TSCS044 Failed to setup master server.

An error has occurred while setting up the master server. This might due to an error while setting the master values in the MySQL database. Please check for errors in the 2X log files located in the /tmp/2Xlatestlogdirectory directory.

TSCS045 Unable to start the necessary services to configure installation.

The Apache and MySQL services must be started before the installation is configured as either master or a slave server. Please check for errors in the 2X log files located in the /tmp/2Xlatestlogdirectory directory.

TSCS046 Cannot reload installed policy.

After the necessary changes, the SELinux policy must be reloaded for the changes to take effect.

TSCS047 Unable to clear shared memory. Please clear it manually by using the ipcrm and ipcs tools.

At the start of the configuration process, the shared memory is cleared to minimise the chances of errors during configuration. If this fails, use the ipcrm and ipcs tools to find and clear the shared memory segment allocated to the 2X ThinClientServer.

TSCS055 An error occurred when closing the XML report file.

An XML report file element could not be properly closed, making the file not well formed.

2X ThinClientServer (Linux) Slave Redundancy Error Messages

TSRD001 This is not the master server.

The IP/hostname of the server you provided is not a 2X ThinClientServer in master mode.

TSRD002 The master cannot reach the slave server.

The external IP/hostname of the slave server is not reachable by the master 2X ThinClientServer. Make sure that the network configuration is correct and that the address is routable. Also, ensure that no ports are blocked by a firewall.

TSRD003 Schema mismatch.

The database schema of the master server does not match the one installed on this slave server. Make sure that the versions of the both the master server and of this server match. If the error persists, follow the instructions to generate a debug log and send it to the 2X Support Centre.

TSRD004 Session error.

An error has occurred during the replication process. This can be due to a network error or to lack of resources on the master of slave server.

TSRD005 Invalid console credentials.

The credentials provided for the master 2X ThinClientServer do not

match the credentials used in the Management Console. Verify that the credentials are correct in the Management Console and try again.

TSRD006 Administrator does not have the rights to install new slaves in this farm.

You do not have enough rights to install a slave server. Contact your administrator.

TSRD007 Cannot get mysqldump.

A critical error has occurred when replicating the database contents. Follow the instructions to generate a debug log and send it to the 2X Support Centre.

TSRD008 Invalid or expired licence key.

Contact your 2X ThinClientServer sales representative for an Enterprise Edition licence key.

TSRD051 Cannot open session lock file.

An error has occurred when attempting to read the session lock file. Make sure that you have the sufficient credentials to perform these operations.

TSRD052 Cannot write session lock file.

An error has occurred when attempting to write the session lock file. Make sure that you have the sufficient credentials to perform these operations.

TSRD053 Cannot connect to the master server.

The IP/hostname of the master server is not reachable by this server. Make sure that the network configuration is correct and that the address is routable. Also, ensure that no ports are blocked by a firewall.

TSRD054 Missing parameters.

An internal error has occurred. Follow the instructions to generate a debug log and send it to the 2X Support Centre.

TSRD055 File transfer error.

An error has occurred during the replication process. Please try again. If the error persists, check that the network connection is working properly.

TSRD056 File open error.

A required file in the replication process is missing. Ensure that all ThinClientOS images on the master server are installed correctly. If the problem persists, follow the instructions to generate a debug log and send it to the 2X Support Centre.

TSRD057 File write error.

A required file in the replication process could not be written. Ensure that you have enough permissions to complete the replication process and that there is enough disk space to replicate the master server. If the problem persists, follow the instructions to generate a debug log and send it to the 2X Support Centre.

TSRD058 Cannot register the slave server.

An error has occurred when registering the slave in the database. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TSRD059 Post update schema mismatch.

The schema that was replicated does not match the schema which was originally installed on the slave server. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TSRD065 Cannot open server_id.

An error has occurred when trying to identify the ID of the master server. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TSRD066 Cannot write server_id.

An error has occurred when trying to register the identity of the slave server. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TSRD067 Cannot add new server entry to local database.

An error has occurred when registering the slave in the database. Follow the instructions to generate a debug log and send them to the 2X Support Centre.

TSRD070 Cannot remove directory content.

Ensure that you have enough rights to the folder containing the ThinClientOS images on the slave server.

TSRD071 Cannot create licence file.

An error has occurred when attempting to write the session lock file. Make sure that you have the sufficient credentials to perform these operations.

TSRD072 Cannot write licence file.

An error has occurred when attempting to write the session lock file. Make sure that you have enough disk space.

TSRD073 License file transfer error.

An error has occurred when transferring the licence to the slave server.

TSRD099 An error has occurred in the replication process.

The installation could not be completed successfully due to an error that occurred during part of the installation.

Advanced Configuration

2X ThinClientServer Configuration Options

When diagnosing issues with 2X ThinClientServer, 2X ThinClientOS, or actual Thin Clients, it is possible to set configuration options to override certain behaviour, allowing the Administrator to circumvent potential pitfalls.

These options are activated or deactivated by adding lines in the text file (creating it if necessary):

…/conf/options.conf

…located under the “htdocs” folder containing the Management Console installation. In a typical Windows scenario, the full path would be:

“C:\Program Files\2X\ThinClientServer\apache2\htdocs\conf\options.conf”

This is the list of settings available:

DOMAIN_MODE_2003=1

The default behaviour in terms of passing credentials via the Windows Terminal Server Login is as follows:

Username is passed in the format <user>@<domain> only if…

- <domain> is longer than 15 characters; or
- <user> is longer that 20 characters; or
- DOMAIN_MODE_2003=1 is set

This option can be set to force the system to ALWAYS pass the username in <user>@<domain> format.

FORCE_SINGLE_VGA=1

When using a multi-monitor support, it is possible to disable one of the outputs of a dual head card so as to use the only one output of the vga card and the output of the onboard video card

FORCE_VGA_REVERSED=1

This inverts the ordering of the video cards on the motherboard to be initialized due to hardware or driver malfunctions.

RDP_VERSION=4

The default value for RDP connections is version 5.x. Version 4 is used on legacy Windows NT Terminal Servers.

NUMLOCK=ON

The default behaviour is to leave the NUMLOCK to be set by the BIOS of the PC. You can specify the state of the NUMLOCK for all your ThinClientOS installation by setting it to OFF or ON depending on your requirements.

DESKLOCK=1

When this option is set, it is possible to use the NUMLOCK as a toggle when switching between multiple “Full Screen” connections. The NUMLOCK will toggle wether pressing ALT+TAB will be used by the 2X Desktop or else by the Terminal Server.

ICA_HOTKEYS=ON

This enables the HOTKEYS bundled with the Citrix ICA Client for Linux. These are not enabled by default.

LOAD_NX=1

This option forcefully preloads the NX application to the ThinClientOS

LOAD_RDP=1

This option forcefully preloads the full screen RDP client to the ThinClientOS

LOAD_ICA=1

This option forcefully preloads the Citrix ICA Clientto the ThinClientOS

LOAD_2XA=1

This option forcefully preloads the 2X ApplicationServer client to the ThinClientOS

CODEPAGE=437

Set the codepage to be used by the ThinClientOS. This will be used accessing removable media with file names stored in foreign languages. The default value is 437

MASTER_VOLUME=99

The default volume of the ThinClientOS volume mixer is set to maximum due to the low output of some sound cards. This can be set to a lower value depending on the requirements of the administrator. The values accepted range from 0-99.

BLANK_TIME=5

This setting affects the amount of time the ThinClientOS will wait to blank the screen as an effort to reduce screen burn (screen saver). The amount quoted is in minutes. If you do not want to enable the built in screen saver, you can safely omit the option.

SKIP_VNC_PROMPT=1

When client shadowing is enabled, a prompt is displayed on screen to notify the user that an administrator is going to switch on the shadowing service. This is required by law in most countries. If you want to disable the display of the prompt and enable shadowing anyway, set the option above. Note that it's the responsibility of the Administrator to make sure that the users are notified separately about the shadowing service if need be.

MOUSE_SERIAL=1

This setting should only be set to 1 if you are using a mouse which is plugged in through a serial port. This avoids erratic behavior of the mouse when using serial redirection in an RDP session

Specifications for 2X ThinClientOS

The specifications of your Thin Client depend on two factors: Boot Method and amount of items being published to the desktop. The following guidelines are given to grasp a better idea of the capabilities you will be capable of using depending on your available specifications.

A PXE boot method affects the amount of RAM required by the 2X ThinClientOS since this is used to store the program files. It will also affect startup time depending on the congestion of the network. If you have the availability of a fixed disk inside the Thin Client, do consider to use it since it will avoid unnecessary traffic and offer better redundancy in the event of network outages.

Booting off the CD-ROM offers two options. By default it provides the necessary hooks to boot over the network for Thin Clients with network cards which do not offer PXE booting. It optionally provides an installer as well as a live demo which can be run from the CD itself. The Live CD should be used only for evaluation since updating a site wide installation by re-burning new images is not suggested and/or scalable.

PXE Booting

Minimum Supported Specifications

- CPU: 200MHz Pentium with MMX Instructions
- RAM: 64Mb
- HDD: none
- CDROM: none

Recommended Supported Specifications

- CPU: 800MHz Pentium with MMX Instructions
- RAM: 128Mb
- HDD: none
- CDROM: none

CD Booting

Minimum Supported Specifications

- CPU: 200MHz Pentium with MMX Instructions
- RAM: 32Mb
- HDD: none
- CDROM: CD Reader

Recommended Supported Specifications

- CPU: 200MHz Pentium with MMX Instructions
- RAM: 128Mb
- HDD: none
- CDROM: CD Reader

HDD / Flash Booting

Minimum Supported Specifications

- No swap partition will be created if at least 64Mb RAM is available:
  - CPU: 200MHz Pentium with MMX Instructions
  - RAM: 64Mb
  - HDD: 32Mb
  - CDROM: none (except required for installation)

- A swap partition will be created if less that 64Mb RAM is available:
  - CPU: 200MHz Pentium with MMX Instructions
  - RAM: 32Mb
  - HDD: 64Mb
  - CDROM: none (except required for installation)

    Please note that using a Flash disk in a scenario that required a swap partition will damage the Flash disk. A Flash disk can handle only a limited number of rewrites, and will therefore fail very quickly if used in a swap partition scenario.

Recommended Supported Specifications

- No swap partition will be created if at least 64Mb RAM is available:
  - CPU: 200MHz Pentium with MMX Instructions
  - RAM: 128Mb
  - HDD: 128Mb
  - CDROM: none (optionally required for installation)

Legacy DHCP configuration

Preparing the DHCP server (Windows)

The 2X ThinClientServer is shipped with DHCP Helper application as standard. This is included in both the Standard and Enterprise editions. It is encouraged to use the bundled DHCP Helper. The use of such a utility is sometimes not desired due to various reasons:

- The 2X ThinClientServer was installed on the DHCP Server/Domain Controller
- The DHCP server is already handling PXE booting for other software in your network and the admin policy is to use the 3rd party software
- The PXE stack installed on the Thin Client is prior to version 2.0 or else has some incompatibilities.

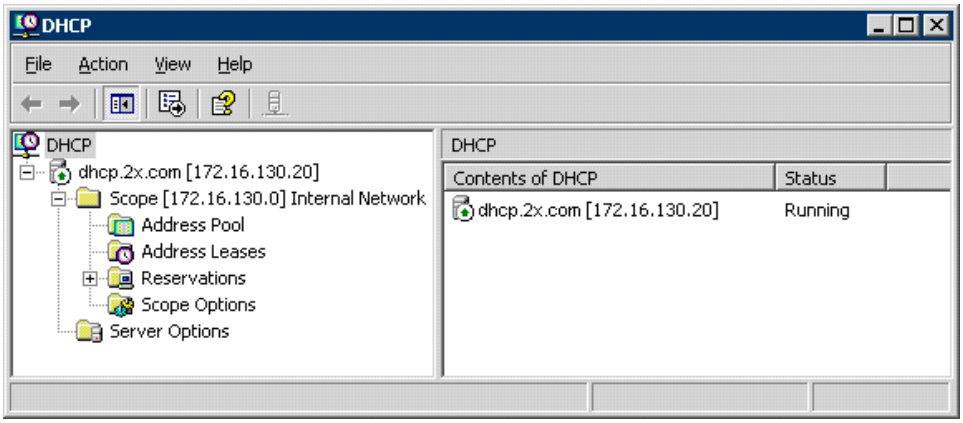
It is IMPORTANT that if you are serving settings directly via your DHCP server, that you do NOT send out conflicting settings by the bundled ThinClientServer. It is important that you accordingly disable the service or use the Whitelist/Blacklist functionality to avoid conflicting multiple broadcasts which can give sporadic errors.

If you will NOT be booting ANY thin clients over the network, you can proceed directly to Part B.

Part A – Booting over the Network

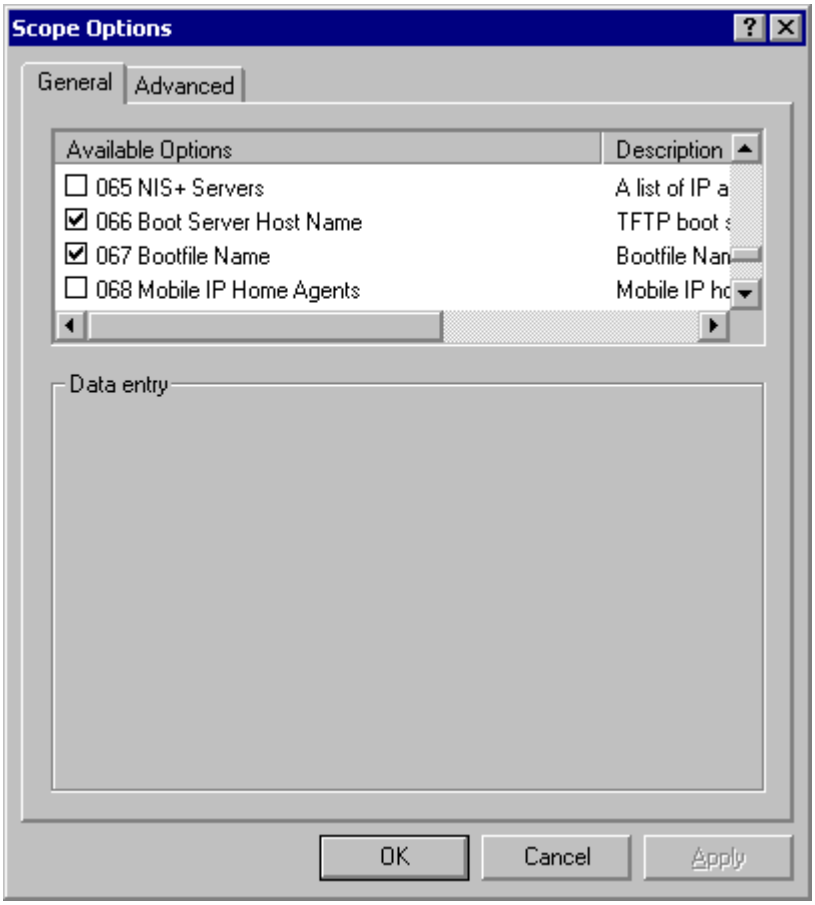
If your thin client will be booting via PXE or Etherboot, you have to configure your DHCP server to tell the thin clients where the TFTP server is located in order to download 2X ThinClientOS:

1. If you are running a Windows DHCP server, go to Start > Administrative Tools > DHCP on the DHCP server. The DHCP configuration will start.



Screenshot 94: DHCP administration utility

2. Right-click the 'Scope > Scope Options' node and select "Configure options…". If you have multiple subnets, be sure to select the scope options of the subnet in which you wish to use 2X ThinClientServer.



Screenshot 95: DHCP scope options

3. In the scope options dialog, browse down to '066 Boot Server Host Name' and enter the IP address of your TFTP/2X ThinClientServer machine (these will be different ONLY if you are using a third-party TFTP server).
4. Browse to the '067 Bootfile Name' option and enter a String Value of 'pxelinux.0'.

Firewall Issues:
Please note that for a DHCP Server to provide TCP/IP settings to the Thin Client successfully, it will be necessary to ensure that: *1. UDP connections on port 67 to the DHCP Server can be established.* *2. UDP connections on port 68 to the Thin Client can be established.* *Please note that for a 3rd Party TFTP Server to serve 2X ThinClientOS to Thin Clients successfully, it will be necessary to ensure that UDP connections on port 69 to the 3rd Party TFTP Server can be established.*

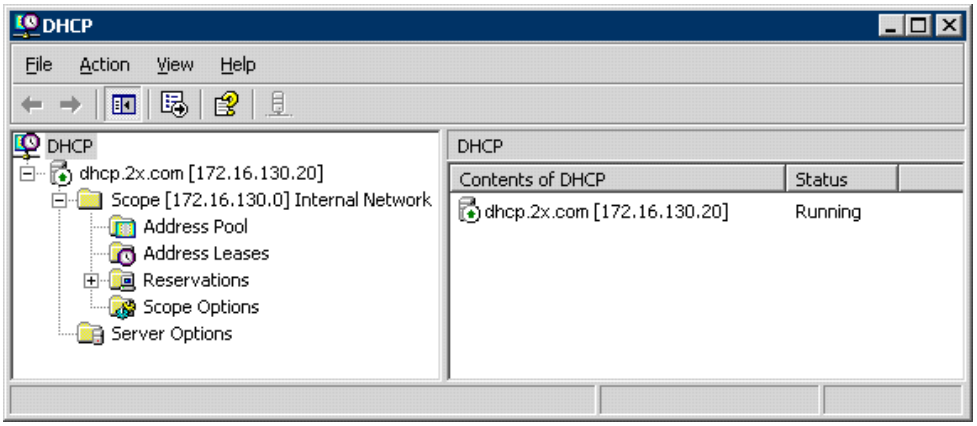
Part B – Booting from media

The 2X ThinClientOS has the capability to locate the 2X ThinClientServer in one of 2 ways:

a. using DHCP

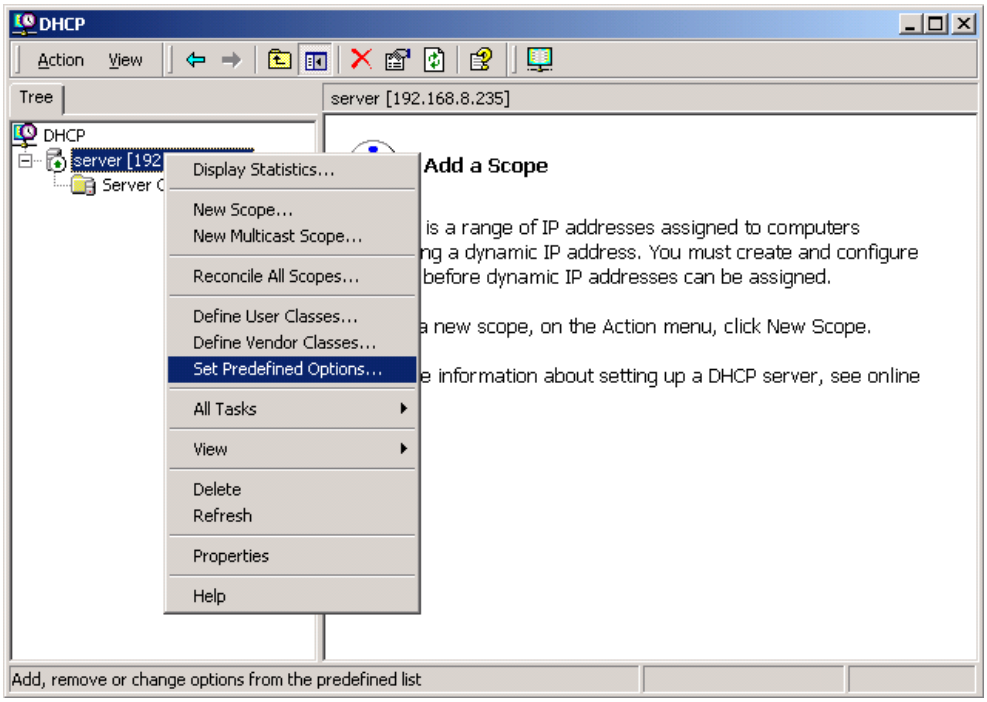
b. using DNS

a. using DHCP



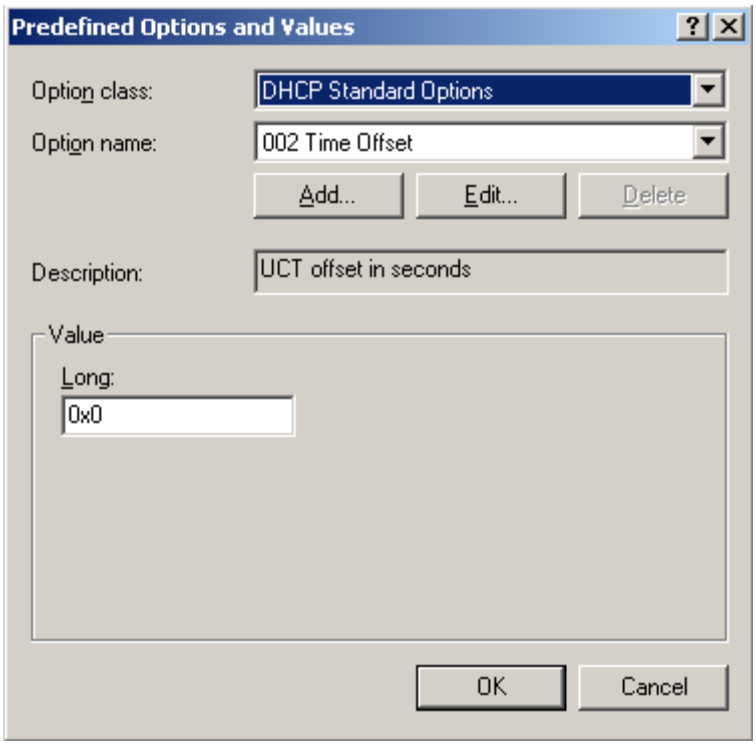
Screenshot 96: DHCP administration utility

1. If you are running a Windows DHCP server, go to Start > Administrative Tools > DHCP on the DHCP server. The DHCP configuration will start.



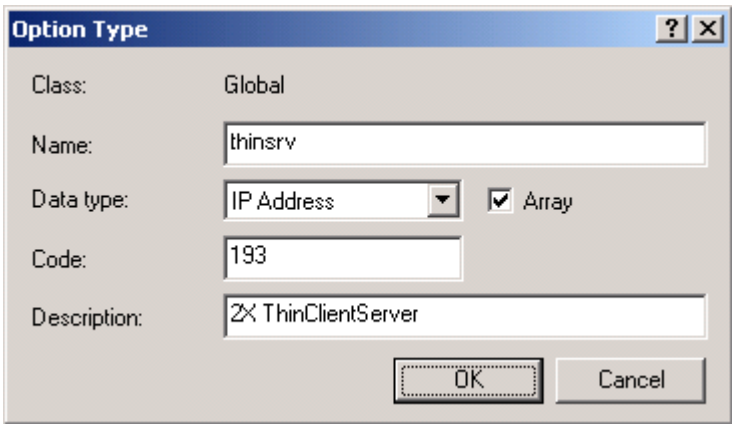
Screenshot 97: DHCP Predefined Options

2. Right-click on DHCP server and select "Set Predefined Options..."



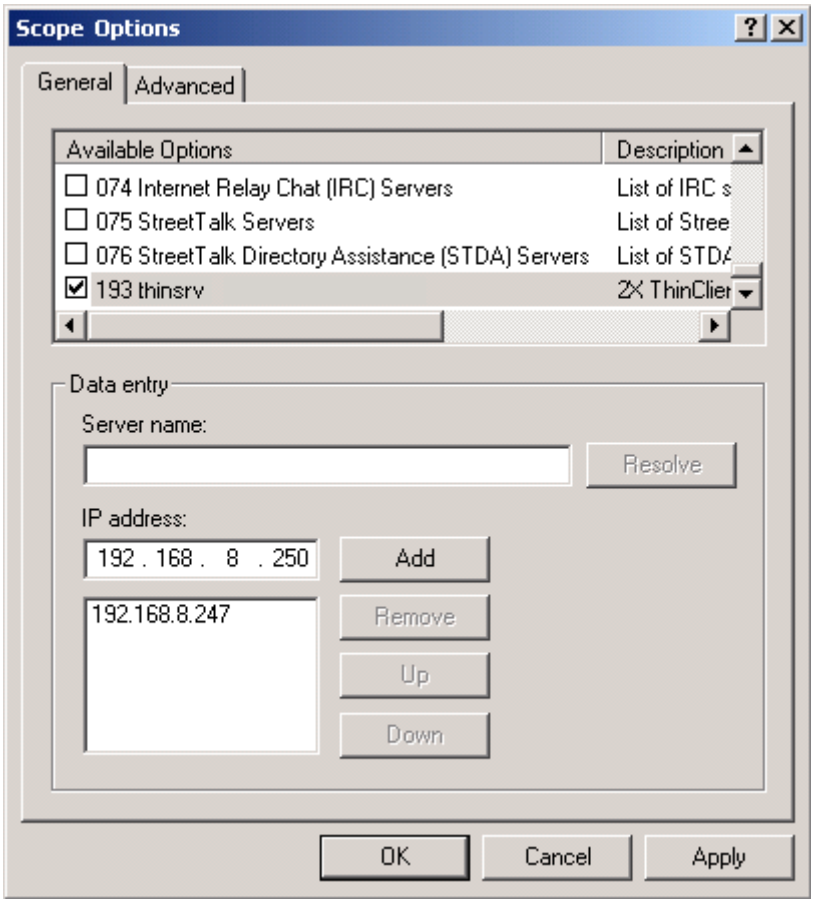
Screenshot 98: Predefined Options dialog

3. In the Predefined options dialog, choose option class "DHCP Standard Options" and click the "Add" button.



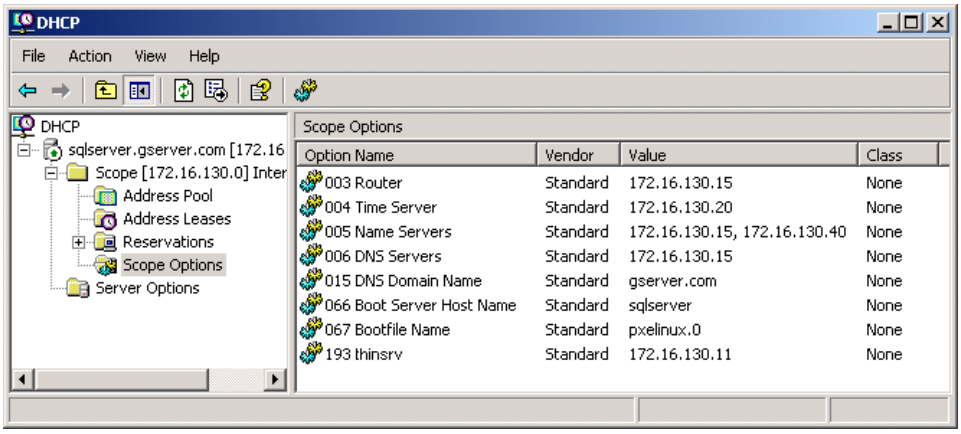
Screenshot 99: Option Type dialog

4. You will need fill in the followings values in the Option Type dialog:
   - "Name:" field type "thinsrv"
   - "Data type" field choose "IP Address" and tick the "array" checkbox
   - "Code" field type "193"
   - "Description" field type "2X ThinClientServer".



Screenshot 100: Option Type dialog

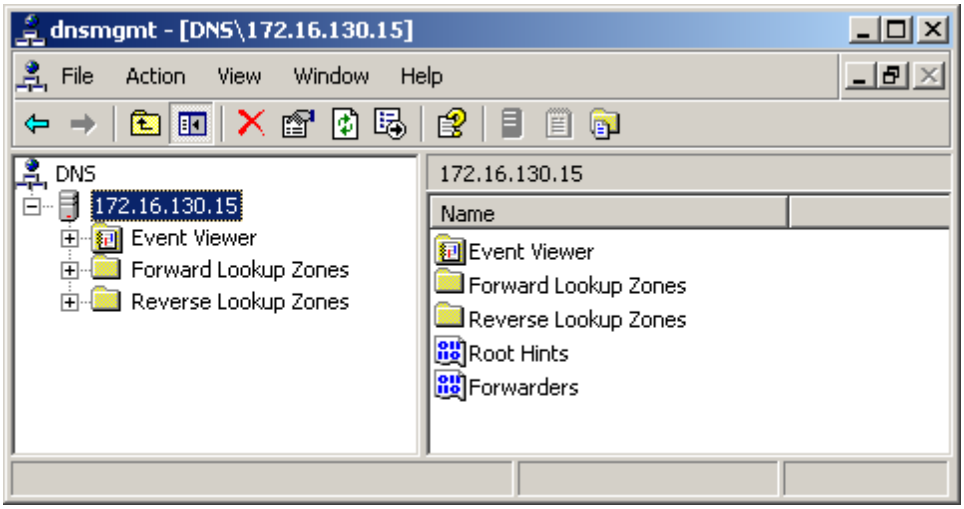
Click OK. The server options should now look as shown in the screenshot. Click OK to exit the dialog.



Screenshot 101: DHCP scope options correctly configured

5. In the main DHCP administrator application, the right pane should show the Scope Options as in the screenshot above.

b. using DNS



Screenshot 102: DNS configuration

1. If you are running the Microsoft Windows DNS server service, go to Start > Administrative Tools > DNS. The DNS configuration will start.
2. Go to the node Forward Lookup Zones and highlight your domain (for example, internal.2x.com).
3. Right-click and select 'New Host (A) ...' to create a new 'A' record.
4. Enter 'thinserver', and the IP address of the 2X ThinClientServer machine. Click 'Add Host' to enter the record. Note: Ensure that the DNS suffix assigned to the machine by the DHCP server matches the domain selected in '2' above.
5. You can confirm that the previous 4 steps have been performed correctly by executing, from a command prompt:

   `ping thinserver.internal.2x.com`

   …(replacing "`internal.2x.com`" with the domain selected in step '2' above).

   If the ping command does NOT receive a response, please review the above steps carefully and identify where you could have made an error with the configuration steps.
6. If the ping command receives a response, you are ready to proceed to the next step.

Firewall Issues:
Please note that for a DNS Server to resolve host and domain names successfully, it will be necessary to ensure that TCP connections on port 53 to the DNS Server can be established.

Preparing the DHCP server (Linux)

The 2X ThinClientServer is shipped with DHCP Helper application as standard. This is included in both the Standard and Enterprise editions. The use of such a utility is sometimes not desired due to various reasons:

- The 2X ThinClientServer was installed on the DHCP Server/Domain Controller
- The DHCP server is already handling PXE booting for other software in your network and the admin policy is to use the 3rd party software
- The PXE stack installed on the Thin Client is prior to version 2.0 or else has some incompatibilities.

It is IMPORTANT that if you are serving settings directly via your DHCP server, that you do NOT send out conflicting settings by the bundled ThinClientServer. It is important that you accordingly disable the service or use the Whitelist/Blacklist functionality to avoid conflicting multiple broadcasts which can give sporadic errors.

If your thin client will be booting via PXE or Etherboot, you have to configure your DHCP server to tell the thin clients where the TFTP server is located in order to download 2X ThinClientOS. To do this you will need to add the highlighted settings in the configuration file for your DHCP server. We are providing a sample configuration which you can use as a template. The text in gray is required to enable PXE booting with 2X ThinClientServer. The text in red should be replaced with the IP address of where the 2X ThinClientServer is installed. The text in blue should be replaced with the IP address of where the TFTP server is installed. All IP addresses and ranges should be changed appropriately for your network.

```
option domain-name "2x.com";
option domain-name-servers 192.168.0.1;
option routers 192.168.0.1;
option thinsrv code 193 = array of ip-address;
ddns-update-style none;
default-lease-time 3600;
subnet 192.168.0.0 netmask 255.255.255.0 {
  range 192.168.0.128 192.168.0.254;
  default-lease-time 3600;
  max-lease-time 172800;
```

```
  option thinsrv 192.168.0.10;
  option routers 192.168.0.1;
  next-server 192.168.0.10;
  option tftp-server-name "192.168.0.10";
  # required by Intel PXE-2.1
  server-identifier 192.168.0.10;
  filename "/pxelinux.0";
}
```

Preparing the DNS server (optional)

If one or more of your thin clients will be booting from CD-ROM or hard disk, you have to configure an 'A' record in your DNS server called 'thinserver', which points to the 2X ThinClientServer machine. Please consult the documentation of the DNS software that was shipped with your Linux distribution.

Configuring Time Synchronization (optional)

If your users are using the 2X desktop, they would want to have the time on their clock updated to the exact time. This can be set on your DHCP server by following the same instructions as in the section Preparing the DHCP server. Add an entry for Option 42 in the scope which is the IP address of an NTP server on your network. If you are in a Windows domain, the Domain Controller by default acts as your domain's NTP server to keep the clients in sync.